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FACILITATING HEALTHY INTERPERSONAL RELATIONSHIPS FOR ADOLESCENTS  
WITH AUTISM: AN EXAMINATION OF KNOWLEDGE ACQUISITION AND  
RETENTION OVER TIME

A Dissertation

Submitted to the School of Education

Duquesne University

In partial fulfillment of the requirements for  
the degree of Doctor of Philosophy

By

Elizabeth A. Pask

August 2015

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Elizabeth A. Pask

2015

**DUQUESNE UNIVERSITY**  
**SCHOOL OF EDUCATION**  
**Department of Counseling, Psychology, and Special Education**

***Dissertation***

Submitted in partial fulfillment of the requirements  
for the degree  
Doctor of Philosophy (Ph.D.)

**School Psychology Doctoral Program**

***Presented by:***

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M.S.Ed. School Psychology, Duquesne University, 2011  
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**April 16, 2015**

**FACILITATING HEALTHY INTERPERSONAL RELATIONSHIPS FOR ADOLESCENTS  
WITH AUTISM: AN EXAMINATION OF KNOWLEDGE ACQUISITION AND  
RETENTION OVER TIME**

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## ABSTRACT

# FACILITATING HEALTHY INTERPERSONAL RELATIONSHIPS FOR ADOLESCENTS WITH AUTISM: AN EXAMINATION OF KNOWLEDGE ACQUISITION AND RETENTION OVER TIME

By

Elizabeth A. Pask

August 2015

Dissertation supervised by Tammy L. Hughes, Ph.D.

The study seeks to evaluate the effectiveness of the *Healthy Relationships & Autism* (HR) curriculum (Sutton & Wesley Spectrum Services, 2013), which is a developmentally sequenced, manualized treatment intended for children and adolescents with an Autism Spectrum Disorder (ASD). The HR curriculum is designed to facilitate healthy interpersonal relationships in children and adolescents with ASD. Specifically, this study investigates the effectiveness of Module 2 of the curriculum, which focuses on teaching basic biological sex education, using well researched techniques designed to reach individuals with ASD. The paper elaborates on the history and development of the need to address these issues, both clinically and in the literature. The study has examined the knowledge acquisition and retention of a sample of adolescents based the results of a pre- and post-intervention test, using a quasi-experimental, repeated measures design was within the study.

Research question 1a investigated whether or not the HR curriculum is effective in the initial knowledge acquisition of basic biological sexual education for children and adolescents with an ASD. A paired samples t-test was used to determine whether or not there was a significant increase in score from pretest to posttest for all participants. Research question 1b investigates whether or not the participants in the HR curriculum achieved mastery of the module content as measured by at least an 85% correct on the initial posttest following the completion of Module 2. Descriptive statistics were reported to describe the results. Research questions 2a and 2b investigate whether or not the HR curriculum is effective for the retention of basic biological sex education knowledge children and adolescents with an ASD of all functioning levels. A repeated measures analysis of variance (ANOVA) and individual visual analyses were used to determine the extent of the effect of the HR curriculum on knowledge retention.

Results of the study indicate that the HR curriculum was effective in increasing knowledge acquisition for the participants in the sample. In addition, results indicate overall effectiveness in knowledge retention overtime for adolescents who span the spectrum in terms of skill and functioning abilities.

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## CHAPTER I

### INTRODUCTION

Human sexuality and healthy sexual development are dynamic processes, characterized by basic human needs such as self-acceptance, feelings of value and attractiveness, and the sharing of thoughts and feelings (Haffner, 1995; Koller, 2000). Healthy sexual development includes both physiological functioning and physical maturational changes such as those that occur during puberty as well as the acquisition and development of the knowledge, beliefs, and attitudes that an individual may have about sexuality (Gabriels & Van Bourgondien, 2007; Haffner, 1995). Moreover, sexuality is a construct that extends beyond healthy physical development and physical relations between individuals to include both social and romantic relationships, and future social aspirations.

The development of healthy sexuality is important for all humans, including children and adolescents, because it is a critical factor in an individual's ability to bond with others and build and maintain an overall pleasurable life. Adolescence is a crucial time in which most individuals begin to develop the knowledge and skills necessary for healthy sexual development. There are a variety of sources that adolescents utilize for learning developmentally and socially appropriate behaviors, including obtaining information from their parents, teachers, peers, or media, for example. Further, adolescents focus on understanding the physical and emotional changes that occur during this time. Adolescents with developmental disabilities such as Autism Spectrum Disorders (ASD) are no different from their neurotypical peers during this time in the desire to understand and develop a healthy sexuality. That is, the physical development of youth with ASD is similar to neurotypical peers. However, some symptoms of ASD are hypothesized to interfere with sexual knowledge acquisition (Haracopos & Pedersen, 1992; Konstantareas & Lunsky, 1997; Ousley & Mesibov 1991). Further, symptoms of ASD may impede a healthy

sexual expression (Travers & Tincani, 2010) making it imperative for caregivers to understand the nature of ASD and how it will manifest as adolescents develop.

### **Autism Spectrum Disorders and Sexual Development**

Autism spectrum disorders are characterized by deficits in social interaction, communication, and the presence of stereotyped and repetitive behaviors. It is essential that as older children and adolescents with ASD become young adults, they are able to learn and perform behaviors that are appropriate given their natural maturation. Such skills may include dressing themselves, meeting hygiene needs, and recognizing, making, and keeping friends. In order to be successful at these tasks, it is critical for these youth to understand the natural, maturational changes their bodies go through during adolescence and the impact that these changes will have upon their interest in, and success with relationships with similar aged peers.

Although children and adolescents with ASD experience typical physical development, including sexual urges and desires, they are often unable to understand these changes and relationships in a typical way. Similarly, social norms that govern appropriate behavior are challenging for adolescents with ASDs to understand due to the deficits in socialization and communication that define ASD. This mismatch between physical and social developmental levels can lead to inappropriate relationship pursuit strategies such as obsessional following, invasion of personal space, harassment, etc. (Stokes, Newton, & Kaur, 2007) and other social and behavioral difficulties such as demonstrating propriety, sexual acting out, risk of being abused/abusing, etc. (Travers & Tincani, 2010). When social reciprocity deficits experienced by individuals with ASD interfere with the successful acquisition and retention of sexual knowledge, there is some evidence that individuals with ASD are then more inclined to demonstrate unacceptable sexual behaviors (Hellemans, Colson, Verbraeken, Vermeiren, & Deboutte, 2007; Mehzabin & Stokes 2011; Stokes & Kaur, 2005; Stokes, Newton, & Kaur,

2007). These inappropriate strategies may lead to unsatisfying social outcomes, social isolation, or, in a small number of cases, sexual offenses committed by individuals with ASD.

### **Significance of the Problem**

Despite early misconceptions, adolescents with an ASD are interested in sexuality (Haracopos & Pedersen, 1992; Konstantareas & Lunskey, 1997; Ousley & Mesibov 1991). Specifically, individuals with ASDs indicate the desire to pursue and maintain relationships and engage in sexual behaviors despite having a lack of social understanding of the nuances and social norms that govern appropriate behaviors. The mismatch between desire and understanding often leads to difficulties faced by adolescents with ASD. Difficulties range from problems demonstrating appropriate decorum in social relationships, exhibiting masturbation in inappropriate contexts, undressing in public, obsessional following, and also the commission of sexual offenses has been reported both clinically and in the extant literature base. Based on the symptoms of ASD, which can also interfere with successful sexual knowledge acquisition, coupled with the documented risks that children and adolescents with ASD face in regard to feelings of loneliness and isolation, there is a need for interventions that have been shown to be effective in facilitating appropriate sexual knowledge acquisition and increasing appropriate social and interpersonal interactions in children and adolescents with ASD.

Thus, there exists both a need and a desire from children and adolescents with ASDs to be able to develop, pursue, and maintain and health sexuality and gain the benefits that accompany healthy, reciprocal, dating and ultimately intimate relationships with others. Without the acquisition and retention of the knowledge necessary to engage in healthy sexual development and relationships (e.g., basic hygiene, sexual education, knowledge of health relationships), there are both health and safety risks. Specifically, the lack of appropriate knowledge and the ability to practice and use this knowledge, and health risks such as those that

present from unhygienic practices may put children and adolescents in danger of developing health concerns related to these behaviors. Additionally, safety risks for both the individuals with ASD and those with whom they are close can become problematic due to the possibility of inappropriate sexual expressions or behaviors. The behaviors of adolescents with ASD are also potentially vulnerable to misinterpretation and being viewed negatively by their peers, resulting in dissatisfaction, a failure to maintain relationships (Stokes & Kaur, 2005; Stokes, Newton, & Kaur, 2007), or in some cases, legal action (Walters et al., 2013).

With effective sex education curricula that utilizes appropriate teaching strategies conducive for learning of children and adolescents with ASD, a better understanding about the nature of the changes and desires they experience will be possible. In addition, there will be an increased possibility to prevent the problem behaviors reported to accompany adolescents with ASD (Koller, 2000; Sullivan & Caterino, 2008), and children and adolescents will be able to better pursue age appropriate relationships with others, both friendly and romantic, for an overall more pleasurable life.

### **Relevant Literature**

Children and adolescents with ASD will experience physical development at a rate which is typical, including the emergence of secondary sex characteristics (e.g., pubic hair growth, breast development) during puberty and the typical accompanying sexual urges and desires (Gabriels & Van Bourgondien, 2007; Sullivan & Caterino, 2008). Additionally, emotional changes and increasing sexual urges accompany adolescence; although, in the ASD population, accompanied emotional development may be delayed (Gabriels & Van Bourgondien, 2007; Sullivan & Caterino, 2008). The available literature concerning the sexuality of and the sex education options for individuals with autism is limited.



Research suggests that individuals diagnosed with an ASD not only have less knowledge about sexuality, but are also less likely to acquire appropriate social skills and courting and romantic behaviors through interactions with family, peers, observation and media as compared to their neurotypical peers, suggesting that adolescents with ASD are disadvantaged, as they are not able to benefit from the same social learning as their peers (Stokes & Kaur, 2005; Stokes, Newton, & Kaur, 2007). For example, in a study by Stokes et al. (2007), it was found that irrespective of age, young adults with ASD differed from typically developing peers in their social learning from peers and friends as sources,  $F(1, 58) = 11.53, p = .001, \eta^2 = .17$ , and their romantic learning from their peers and friends,  $F(1, 58) = 21.78, p < .001, \eta^2 = .27$ . In other words, the results of the study indicate that individuals with ASD seem not to be able to learn in the same way as their neurotypical peers (i.e., intrinsically, through social interactions) about social and romantic knowledge.

There are commonly held misconceptions that, due to the nature of ASD symptoms, children and adolescents with ASD are uninterested in sexuality, are sexually immature, or are asexual (Konstantareas & Lunskey, 1997; Murphy & Elias, 2006; Sullivan & Caterino, 2008). Specifically, early research suggested that those with ASD, and males in particular, had no interest in sexual intercourse (DeMyer, 1979) and therefore, experienced few sexual problems (Dewey & Everard, 1974). Often, the incapacity to learn social skills through informal interaction, as typically developing individuals do, is incorrectly perceived as the preference for being isolated (Stokes & Kaur, 2005). Research suggests that when sexual interests and behaviors were noted in individuals with ASD, they were generally viewed in a negative manner by caregivers, teachers, and peers due to the social impairments, inappropriate courting behaviors, and related stereotypes (Murphy & Elias, 2006; Murphy & Young, 2007; Sullivan & Caterino, 2008). Therefore, inquiring into the attitudes, beliefs, and knowledge of sexuality of

adolescents with ASD was thought to be impractical and unnecessary (Konstantareas & Lunsky, 1997).

More current research suggests that social impairments associated with ASD do not translate to lack of interest in relationships and intimacy with others (Koller, 2000; Kontstantareas & Lunsky, 1997; Sullivan & Caterino, 2008). In fact, this research states that individuals with ASD demonstrate an equivalent interest to that of their neurotypical peers in the areas of sexuality, sexual education and pursuing relationships. For example, a study by Konstantareas and Lunsky (1997) noted that in a sample of 15 adolescents with ASD and 16 adolescents with a developmental delay, most expressed interest in many activities shown to them in pictures, including dating, getting married and having children. Results also indicated that individuals with autism endorsed interest in sexual activities more so than peers with developmental delay, including holding hands with a romantic partner, masturbating, and engaging in sexual intercourse.

In adolescents with ASD, it has been shown that sexual desires are not reduced nor are deviant to those of the general population and that adolescents with ASD are similar to those of the general population in that they endeavor to pursue and maintain intimate relationships (Stokes & Kaur, 2005). In a study of 24 institutionalized adolescent and young adult males, Hellemans, et al. (2007) found that age appropriate sexual behaviors such as masturbation, desire for intimate relationships, and difficulty with developing relationships were reported by familiar caregivers.

Due to the social deficits they experience, such as the inability to recognize affective cues, communication skills, and perspective taking ability, adolescents with ASD may guilelessly engage in intrusive or inappropriate behaviors while trying to initiate and pursue relationships with others (Stokes & Kaur, 2005; Stokes et al., 2007). For example, Stokes et al.

(2007) describe the subtle difference between appropriate courtship behaviors such as calling, writing, and meeting to get together and when these become more intrusive behaviors that might resemble stalking. It may be difficult for adolescents with ASD to discern such differences due to inept social understanding. In addition, Stokes and Kaur (2005) found that due to a combination of the lack of social understanding and the perseverative nature of some individuals with ASD, a determined pursuit, harassment, or intimidation of another into some kind of relationship may ensue.

Hellemans, et al. (2007) found that in their sample, some sexual problems of subjects included masturbation in the presence of others, deviant or harmful masturbation, unwanted sexual touching, unwanted attempt to intercourse, pedophilia, fetishism, and anxiety with regard to sexuality. It was also demonstrated by the study that although the theoretical knowledge of self-care and sociosexual skills was rated adequate by caregivers, the actual practice of self-care and sociosexual skills was inadequate in several individuals. In other words, there was an interest and awareness about self-care and sexuality, but actual engagement of these activities was poor. For example, survey responses indicated problems with lack of hygiene, talking too candidly about sexuality, and public touching of genital areas. This provides evidence for the need for sexual education and training to address the interests and actions related to sexuality for adolescents with ASD.

### **Current Study**

The purpose of the current study is to empirically investigate the effectiveness of a sexual education curriculum, the *Healthy Relationships* curriculum, in the acquisition and retention of sexual knowledge in adolescents with an ASD. Specifically, the study seeks to determine if the *Healthy Relationships* curriculum is useful for the successful acquisition of appropriate sexuality related knowledge, whether or not the knowledge is retained following initial acquisition, and

whether or not the curriculum is useful for a broad range of ability levels that is typically seen on the Autism spectrum.

### **Research Questions and Hypotheses**

Research Question 1a: Does the *Healthy Relationships* program increase the knowledge acquisition of basic biological sexual education for children and adolescents with an autism spectrum disorder?

Hypothesis 1a: The *Healthy Relationships* program will significantly increase the knowledge acquisition of basic biological sexual education for children with and autism spectrum disorder.

Research Question 1b: Will the majority of participants in the *Healthy Relationships* achieve mastery of Module 2 content, as defined by 85% passing rate on the initial posttest?

Hypothesis 1b: The majority of participants in the *Healthy Relationships* program will achieve master of Module 2 content, as defined by an 85% passing rate on the initial posttest.

Research Question 2a: Is the *Healthy Relationships* program useful in the retention of knowledge of basic biological sexual education for children and adolescents with an autism spectrum disorder?

Hypothesis 2a: The *Healthy Relationships* program will be useful in the retention of knowledge of basic biological sexual education for children and adolescents with autism spectrum disorder.

Research Question 2b: Do the rates of knowledge and retention of basic biological sexual education vary based upon level of functioning for children and adolescents with and autism spectrum disorder?

Hypothesis 2b: Rates of knowledge and retention of basic biological sexual education will not yield significant differences between low, moderate, or high functioning children and adolescents with an autism spectrum disorder.

The development of healthy relationships with others is a central aspect of life and is critical for high quality of life and for overall life satisfaction. Developing a healthy sexuality is important for all children and adolescents because it is critical in the bonding, developing relationships, and an overall healthy and fulfilling lifestyle. Because social adeptness is necessary for successful and healthy sexuality development, children and adolescents with an ASD often have difficulty due to the social deficits that define their disorder (Stokes, Newton, & Kaur, 2007).

The study will seek to investigate the effectiveness of the *Healthy Relationships* curriculum, a developmentally sequenced curriculum that utilizes evidence based strategies that are successful for individuals with an ASD. Specifically, the study seeks to determine whether or not the curriculum is helpful for knowledge acquisition by examining the differences between pre and posttest measures of the second module of the curriculum, Basic Biological Sex Education. Additionally, retention of sexuality related material will be examined using additional post tests at several other points in time after Module Two sessions have been completed. Because there are a wide variety of levels of functioning, acquisition and retention of knowledge will be compared between two groups, a high functioning group of adolescents with an ASD and a lower functioning group to understand whether or not the curriculum is able to facilitate and improve appropriate social and interpersonal relationships and increase the quality of life of a varying ability levels of children and adolescents with an ASD.

## CHAPTER II

### REVIEW OF THE LITERATURE

Sexual development is a dynamic process that is closely linked with basic human needs such as acceptance, feelings of worth and attractiveness and the sharing of thoughts and feelings (Haffner, 1995; Koller, 2000). Additionally, healthy sexual development not only involves physiological functioning, but also the knowledge, beliefs and attitudes surrounding sexuality (Gabriels & Van Bourgondien, 2007; Haffner, 1995). Sexuality is a construct that extends beyond physical relations and should include socialization, healthy physical development, relationships, both romantic and otherwise, and future aspirations.

The development of healthy sexuality is important for children and adolescents because it is a critical factor in bonding with others, developing relationships, and building and maintaining an overall pleasurable life. Adolescence is a crucial time in which most learn developmentally and socially appropriate behaviors from a variety of sources, as well as understanding the physical and emotional changes that occur during this time. Adolescents with developmental disabilities, such as Autism Spectrum Disorders (ASD), are no different from their neurotypical peers during this time in their desire to understand and develop a healthy sexuality.

It is essential that as older children and adolescents with ASD, characterized by deficits in social interaction, communication, and the presence of stereotyped and repetitive behaviors, become young adults they are able to learn and perform behaviors appropriate for maturation. Such skills may include dressing themselves, meeting hygiene needs, and recognizing, making, and keeping friends. In order to be successful at these tasks, it is critical for these children to understand the natural, maturational changes their bodies experience during adolescence and the impact these changes will have on their interest in and relationships with similar aged peers.

There is emerging research that suggests that social reciprocity deficits experienced by individuals with ASD may interfere with the successful acquisition of sexual knowledge. In addition, these individuals are more inclined to demonstrate unacceptable sexual behaviors due to social ineptness as well as some other additional risk factors (e.g. predisposition toward abuse, misinterpretation of actions; negatively viewed by peers, etc.)

Although children and adolescents with ASD experience normal physical developmental changes and the associated increased interest in romantic relationships, they are often unable to understand these changes and relationships in a typical way. This is due to the psycho-social symptoms that define their disorder, which includes deficits in socialization and communication as well as the presence of repetitive and stereotyped behaviors and interests. This mismatch between physical and social developmental levels can lead to inappropriate relationship pursuit strategies. These inappropriate strategies may lead to unsatisfying social outcomes, social isolation, or, in a small number of cases, sexual offenses committed by individuals with ASD. Therefore, the need for effective sexual education curricula for this population is evident.

There is a wide variety of methods used to deliver sexual education curricula. Due to the symptoms that individuals with autism experience, techniques and strategies should be used in a way that is conducive for an individual with ASD to learn and retain pertinent information. Such techniques may include repetition, reinforcement, concrete instruction, role plays, video modeling, etc. With the recognition of the importance of sex education for children and adolescents with ASD and an understanding of the most appropriate ways to teach individuals with ASD, effective curricula can be developed to help teach this important information.

### **Overview of Autism Spectrum Disorders**

The core features of autism and Asperger's disorder were first reported by Leo Kanner (1943) and Hans Asperger (1944). The children described by these researchers showed social,

communicative and behavioral features that were unique from disorders such as intellectual disability and childhood onset schizophrenia. Although described independently from one another, both Kanner and Asperger identified groups of children with similar features of social impairments and restrictive behaviors that were more prevalent in males than females.

Asperger's sample, however, included children with superior cognitive and language abilities to those described by Kanner (Asperger, 1944; Campbell, 2006). The boundaries between these disorders are not yet clearly understood, because there is significant overlap of symptoms between them. However, they share a triad of neurological impairments, including impairments in communication, impairments in social interaction, and the presence of restricted, repetitive, and stereotyped patterns of behavior, interests, or activities according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR, American Psychiatric Association [APA], 2000).

### **Autistic Disorder**

Autistic disorder, also known as Autism, is a neurodevelopmental, behaviorally defined disorder categorized by a wide-ranging group of symptoms. Autism is demarcated by a pattern of six symptoms across the domains of social interaction, communication, and patterns of behavior (APA, 2000). There is a broad spectrum of symptoms and ability levels among individuals diagnosed with autism.

**Social functioning.** Kanner (1944) indicated that the most fundamental symptom evident in his sample was an inability to relate to others. Presently, impairments in social reciprocity and interpersonal functioning still represent a core deficit that reliably distinguishes autism from other disabilities (Bishop & Lord, 2006; Campbell, 2006). Social impairments have been documented in children with autism across the lifespan and beginning very early in life (Bishop & Lord, 2006; Campbell, 2006). Newborns and infants with autism may fail to orient to



social stimuli, may lack initiation and response to joint attention, and may not imitate motor movements (Campbell, 2006).

Older children and adolescents with autism may be unable to appropriately read and respond to facial features, modulate their behavior to be consistent with the context for which they are functioning, or may display an affect that is not contingent upon the social environment. These social reciprocity deficits were originally thought to be due to a complete lack of interest in interacting with others. However, emerging research suggests that these impairments may be due to an inability to understand social cues and interactions, causing these individuals to be unable to respond to and interact appropriately with others (Grofer Klinger, Dawson, & Renner, 2003).

**Language and communication abilities.** Language delay is frequently present in children with autism and accounts for the most common early complaint by parents (Bishop & Lord, 2006; Campbell, 2006). Some children are mute and will not develop language at all in their lifetimes. Common in early language of children with ASD is often labeling instead of requesting, echolalia or the echoing of speech, repetitive or stereotyped speech, and abnormalities in pitch, intonation, and rhythm (Bishop & Lord, 2006). Those who do develop meaningful speech show a range of abilities, but most have abnormalities in their communication skills, such as the incorrect use of pronouns, for instance. In typically developing adolescents, social aspects of language include initiating and sustaining conversations and understanding nuances of social communication that are learned intrinsically simply by exposure, while those with autism are unable to learn in this manner, making those skills impaired (Campbell, 2006). For example, individuals with ASD may have little regard for the interest of their audience or be awkward or inappropriate for the context. Additionally, individuals with autism demonstrate

deficits in receptive communication and language comprehension (Bishop & Lord, 2006). For example, those with ASD may miss the point of instructions or questions

**Restricted and stereotyped behaviors.** Individuals with ASD often engage in repetitive, perseverative, and stereotyped behaviors and interests, which are often disruptive. This category is the most heterogeneous of the domains of autism, as these difficulties can take many forms across individuals. Behaviors may include body rocking, hand waving, and hand flapping, in addition to elaborate rituals and overly repetitive activities and interests (Campbell, 2006). Children with autism frequently prefer to follow a strict routine and have difficulty adapting to change in their daily routines (Bishop & Lord, 2006). For example, they may prefer to follow an identical route to school every day, or become distressed when a change in schedule occurs, such as an assembly at school. Similarly, individuals with autism often become unusually attached to a particular item, or may focus on a single aspect of an object. For example, an older child or adolescent may only prefer to talk about or play with a model plane, and may become focused specifically to the propeller (e.g., playing with only the propeller, talking only of the propeller's purpose).

Children and adolescents with autism may also develop extreme fascinations and/or preoccupations with particular objects or events (Bishop & Lord, 2006). For example, an individual may exhibit an extreme interest in a particular popular character or an intense interest in and knowledge of a particular species of insects. Often, individuals become perseverative upon topics of interest so much so that they are pervasive throughout conversation, activities, and thoughts regardless of the appropriateness for the time. This is problematic because it may interfere with daily tasks, learning, and importantly, the development of meaningful relationships with others.

Other symptomatology evident in individuals with autism includes frequent, unusual responses to sensory input. Often, children and adolescents with ASD will complain about clothes feeling uncomfortable (too tight or too loose) or have difficulties with the textures of foods, often leading to eating problems. Although not part of the diagnostic criteria for autism, related symptoms including self-injurious behaviors and sleep disorders are commonly reported both clinically and in the research literature (Bishop & Lord, 2006; Campbell, 2006; Grofer Klinger, Dawson, & Renner, 2003.)

### **Asperger's Syndrome and High Functioning Autism**

Asperger's Syndrome (AS), has only recently been recognized as a distinct disorder in the United States (Campbell, 2006; Grofer Klinger, Dawson, & Renner, 2003). According to the DSM-IV-TR (APA, 2000), AS is characterized by impairments in social interaction and restricted repetitive behaviors, identical to the criteria for autism; however, there can be no clinically significant delays in the areas of language functioning, self-help skills, and adaptive functioning with the exceptions of social interaction or cognitive development (APA, 2000). Specific criteria in the DSM-IV-TR (APA, 2000) outline that AS is diagnosed if there are at least three symptoms evident: two under the social reciprocity domain and one under the restrictive and repetitive behaviors domain.

In addition to the specific DSM-IV-TR diagnostic criteria, individuals with AS often demonstrate the characteristics originally described by Hans Asperger (1944). Such characteristics include idiosyncratic language, special interests that may be developmentally appropriate in content but have an unusual intensity or focus, and motor clumsiness (Grofer Klinger, Dawson, & Renner, 2003; Kanner, 1944).

Research suggests that it is unclear whether Asperger's Disorder is distinct from High Functioning Autism (HFA; The National Autistic Society, 2012). Both groups are likely to have

cognitive abilities that are average or above average cognitive abilities. Additionally, both groups have social reciprocity deficits and exhibit restrictive repetitive behaviors or interests. In general, the primary difference between the two disorders is in the area of language development. Those with Asperger's Disorder typically do not have early delayed language development (The National Autistic Society, 2012) while individuals with high functioning autism demonstrate these delays. Often the two terms are used in conjunction or even interchangeably with one another; however, controversy regarding the difference between the two features exists (Henault, 2005). Although features of HFA and AD overlap significantly and present as fundamentally similar, there may be differences such as early language development delay, increased motor difficulties in those with AS, and later age of onset for AD that differentiate the conditions (The National Autistic Society, 2012).

### **Prevalence and Etiology**

The prevalence rates of Autism Spectrum Disorders in children have had an increasing trend within the last fifteen to twenty years (Brassard & Boehm, 2011; Fombonne, 2009), and according to the Center for Disease Control (CDC) have been reported to be as high as 1 in 110 children (2006; 2012). In a review of data collected from 43 studies, prevalence rates ranged from 7.2 to 40.5 per 10,000 with an average prevalence rate at 20.6 per 10,000 (Fombonne, 2009). Autism spectrum disorders also differ in prevalence with regard to sex. ASD has been found to be approximately 4 times more common in boys than girls (Chan & John, 2012; Fombonne, 2009).

The exact cause of autism spectrum disorders is unknown; however, those within the scientific community suggest that genetics play a role in the neurodevelopmental disorder (APA, 2000; Grofer Klinger, Dawson, & Renner, 2003). Sibling studies and twin studies have shown that the probability of receiving a diagnosis of ASD is greatly increased if a sibling has already

been diagnosed and even greater of an increase if that sibling is an identical twin (suggesting that genetic inheritance for the predisposition of autism; Brassard & Boehm, 2011; Grofer Klinger, Dawson, & Renner, 2003; Hertz-Picciotto et al., 2006). No single gene has been identified as a cause for autism and studies suggest there are a number of combinations of genes that could be responsible (Hertz-Picciotto et al., 2006).

A number of environmental factors have also been shown to contribute etiologically. Studies have shown that prenatal and early postnatal exposure to a variety of viruses such as measles, mumps, rubella, herpes, syphilis, cytomegalovirus and toxoplasmosis as well as chemicals such as thalidomide and valproic acid have contributed to the etiology of a small proportion of autism spectrum disorder cases (Hertz-Picciotto et al., 2006).

### **Autism Spectrum Disorders and Sexuality**

Children and adolescents with autism will experience normal physical development and the emergence of secondary sex characteristics (e.g., pubic hair growth, breast development) during puberty (Gabriels & Van Bourgondien, 2007; Sullivan & Caterino, 2008). Additionally, emotional changes and increasing sexual urges also accompany adolescence; although, in the ASD population, these changes may be delayed (Gabriels & Van Bourgondien, 2007; Sullivan & Caterino, 2008). According to Eaves and Ho (1996), about 10-30% of adolescents with ASD have increased behavioral problems during this time, especially those with a comorbid intellectual disability. Engaging in inappropriate sexual behaviors may become a concern for adolescents with ASD because the typical development of sexual drives is not accompanied by an ability to understand the social norms that govern appropriate behaviors (Henault, 2005).

Healthy development of sexuality is essential for adolescents, including those with developmental disabilities because it is an important factor in relationships with others, and an overall pleasurable life (Murphy & Elias, 2006). Most typically developing adolescents learn

how to deal with the maturational changes that occur naturally in adolescents by gathering information from a variety of sources in their daily environment such as peers, parents, teachers and the media (Chan & John, 2012). Social skills are necessary to manage the information gathered during adolescence as well as to manage peer pressure, new relationships, unfamiliar sexual feelings, and romantic desires (Chan & John, 2012). The ability to understand, communicate, and interact in socially appropriate and reciprocal ways is necessary in the pursuit of relationships and in the clarification of sexual knowledge. ASD by its nature is defined by a deficit in social skills and therefore, children with ASD lack the necessary skills for healthy growth and development during adolescence (Chan & John, 2012; Gabriels & Van Bourgondien, 2007).

Research suggests that individuals diagnosed with an ASD are less likely to acquire appropriate social skills and courting and romantic behaviors through interactions with family, peers, observation and media as compared to their neurotypical peers. This suggests that adolescents with ASD are disadvantaged, as they are not able to benefit from the same social learning as their peers (Stokes & Kaur, 2005; Stokes, Newton, & Kaur, 2007). For example, in a Study by Stokes et al., 2007, it was found that irrespective of age, young adults with ASD differed from typically developing peers on social learning from peers and friends as sources ( $F(1, 58) = 11.53, p = .001, \eta^2 = .17$ ), as well as differed on romantic learning from their peers and friends ( $F(1, 58) = 21.78, p < .001, \eta^2 = .27$ ). They found that individuals with ASD received less romantic and social knowledge and skills from their peers and friends than their neurotypical peers.

These social deficits are also of particular importance to sexuality because they negatively affect peer acceptance, communication skills, psychosexual development, relationship building, and intimacy (Sullivan & Caterino, 2008). Social deficits not only interfere with an

individual's ability to form relationships, both friendships and romantic relationships, but also may impede social judgment to determine things such as private versus public activities, who is appropriate to speak with about sexuality, and how and why to manage personal hygiene, for instance (Gabriels & Van Bourgondien, 2007).

### **Early Misconceptions**

There is a commonly held misconception that, due to the nature of autism symptoms, children and adolescents with ASD are uninterested in sexuality, sexually immature, or even asexual (Konstantareas & Lunsky, 1997; Murphy & Elias, 2006; Sullivan & Caterino, 2008). Specifically, early research suggested that those with ASD, and males in particular, had no interest in sexual intercourse (DeMyer, 1979) and therefore, experienced few sexual problems (Dewey & Everard, 1974). Often, the incapacity to learn social skills through informal interaction, as typically developing individuals do, is incorrectly perceived as the preference for being isolated (Stokes & Kaur, 2005). Research suggests that when sexual interests and behaviors were noted in individuals with ASD, they were generally viewed in a negative manner by caregivers, teachers, and peers due to the social impairments, inappropriate courting behaviors, and related stereotypes (Murphy & Elias, 2006; Sullivan & Caterino, 2008). Therefore, inquiring into their attitudes, beliefs, and knowledge of sexuality were thought to be impractical and unnecessary (Konstantareas & Lunsky, 1997).

### **Current Research**

More current research suggests that social impairments associated with ASD do not translate to lack of interest in relationships and intimacy with others (Koller, 2000; Konstantareas & Lunsky, 1997; Sullivan & Caterino, 2008). In fact, this research states that individuals with ASD demonstrate an equivalent interest to that of their neurotypical peers in the areas of sexuality, sexual education, and pursuing relationships.

Despite early notions that the ASD population is unable and uninterested in sexuality, more recent research has shown the contrary. For example, in an early study by Ousley and Mesibov (1991), a group of 21 male and female adults with HFA were surveyed, and it was revealed that both males and females had a greater degree of sexual interest than what had been previously reported in the literature, with males being more interested in sexuality than females. Also revealed in the study was that although interested in sexuality, those with autism engaged in a markedly less amount of sexual activity than their intellectually disabled peers.

In a study that examined 81 Danish adults with ASD in residential facilities, 74% engaged in sexual behavior that included self-stimulatory behavior as well as sexual activity with others (Haracopos & Pedersen, 1992). Males engaged in masturbation more frequently than females while females demonstrated sexual behavior towards others more commonly than males. In the study, 10% of participants indicated desire for romantic relationships, yet none had established a reciprocal, intimate relationship.

In a survey of 89 adolescents and adults with ASD and intellectual disabilities, familiar caregivers described the sexual interest and behaviors of residents in group homes (VanBourgondien, Reichle, & Palmer, 1997). The study found that 34% of participants engaged in physical behavior with another person (i.e., handholding, hugging, kissing, touching, and attempted intercourse). These behaviors were found to be three times more likely to occur in individuals who were nonverbal. It was also indicated in the results that individuals who did not receive any type of sex education were more likely to engage in self-stimulatory sexual behavior while those who had received sex education were more likely to engage in more person-oriented physical behaviors.

In addition, a study by Konstantareas and Lunsy (1997) noted that, in a sample of 15 adolescents with ASD and 16 adolescents with a developmental delay, most expressed interest in



many activities shown to them in pictures, including dating, getting married, and having children. Results also indicated that individuals with autism endorsed more sexual activities than peers with developmental delay, including holding hands with a romantic partner, masturbating, and engaging in sexual intercourse. As a cautionary note, knowledge recognition that indicated the level of awareness of sociosexual terms was evident in most, but a complex understanding of these terms was lacking. For example, almost all subjects knew the term pregnancy and correctly identified the corresponding picture, but only 56% of participants were able to adequately explain how a woman gets pregnant. Awareness and complex understanding are not comparable in the study, and therefore attitudes, experiences, and interests are dependent and could serve different meanings based on the level of understanding of the individual. Nevertheless, the study indicates that individuals with autism express sexuality related views to a greater extent than previously reported in the literature.

Similar results for adolescents have been more recently been researched. In adolescents, it has been shown that sexual desires are not reduced nor are deviant to those of the general population and that adolescents with ASD are similar to those of the general population in that they endeavor to pursue and maintain intimate relationships (Stokes & Kaur, 2005). In a study of 24 institutionalized adolescent and young adult males, Hellemans, et al. (2007) found that age appropriate sexual behaviors such as masturbation, desires for intimate relationships, and difficulty with developing relationships were reported by familiar caregivers.

## **Difficulties**

Despite the interest in and engagement of sexuality related matters, there are problems that arise for individuals with ASD. The problems and difficulties related to sexuality that are experienced by individuals with ASD are a cause for concern for the safety of those individuals and others. For example, in a study that examined the self-assessment of sexuality in

adolescents with HFA, Mehzabin and Stokes (2011) found that in general, when compared to typically developing peers, individuals with HFA engaged in fewer social behaviors, had less education about sex, and had fewer sexual experiences. Additionally, individuals with HFA had marked concerns for the future. Results suggest that specialized sexual education programs for individuals with HFA are necessary and specifically should include education about social rules which would address the pronounced concern for the future as well as develop social communication deficits that are experienced by this population.

Due to the social deficits they experience, such as the inability to recognize affective cues, communication skills, and perspective taking ability, adolescents with ASD may guilelessly engage in intrusive or inappropriate behaviors while trying to initiate and pursue relationships with others (Stokes & Kaur, 2005; Stokes, Newton, & Kaur, 2007). For example, Stokes et al., (2007) describe the subtle difference between appropriate courtship behaviors such as calling, writing, and meeting to get together and when such behaviors become more intrusive behaviors that might resemble stalking. It is difficult for adolescents with ASD to understand the differences due to inept social understanding. In addition, Stokes and Kaur (2005) found that due to a combination of the lack of social understanding and the perseverative nature of some individuals with ASD, behaviors may evolve into a determined pursuit, harassment, or intimidation into some kind of relationship.

Helleman, et al. (2007) found that in their sample, some sexual problems included masturbation in the presence of others, deviant or harmful masturbation, unwanted sexual touching, unwanted attempt to intercourse, pedophilia, fetishism, and anxiety with regard to sexuality. It was also demonstrated by the study that although the theoretical knowledge of self-care and socio-sexual skills was rated adequate by caregivers, the actual practice of self-care and socio-sexual skills was inadequate in several individuals. In other words, there was an interest

and awareness about self-care and sexuality, but actual engagement of these activities was poor. For example, survey responses indicated problems with lack of hygiene, talking too candidly about sexuality, and public touching of genital areas. This provides evidence for the need for sexual education and training to address the interests and actions related to sexuality for adolescents with ASD.

Similarly, Ruble and Dalrymple (1993) surveyed the parents of 100 children with autism who reported a wide range of sexual behaviors that were described as inappropriate. Sixty-five percent of the sample was reported by their parents to have touched genital areas in public, 23% masturbated in public, 18% inappropriately touched a member of the opposite sex, and 14% masturbated with unusual objects.

Other problem behaviors that have been reported in the literature include issues with demonstrating propriety. For example, research has found that adolescents with ASD do not always seek privacy for engaging in behaviors such as undressing. Additionally, they were less aware about rules of privacy, such as knocking on closed doors and not touching private body areas while in public (Haracopos & Pedersen, 1992; Hellemans & Deboutte, 2002; Ruble & Dalrymple, 1993). The physical changes associated with puberty have also been reported to be difficult for adolescents with ASD, which has been hypothesized to be because of a resistance to change that is common in individuals with ASD (Hellemans et al., 2010).

### **Additional Risk Factors**

There are risk factors that may make individuals with autism more inclined to demonstrate unacceptable sexual behaviors (Walters, et al 2013). For example, children and adolescents with ASD may have few rewarding social experiences during childhood and adolescence, have little exposure to erotic material during puberty, and may fail to encounter an adequate sexual partner. Additionally, individuals with ASDs might be subject to, or perpetrators

of, indecent or criminal sexual behaviors such as exhibitionism, voyeurism, frotteurism, sexual assault, pedophilia that are the result of several risk factors including an aggressive nature, history of sexual abuse, imitation of observed aggressive behaviors, sexual dissatisfaction or hostility (Henault, 2005).

It has been reported that children and adolescents with ASD are also more likely to be victims of sexual abuse (Travers & Tincani, 2010) and perhaps more likely to attempt to reenact the experienced abuse. In an analysis of data collected from 1997 through 2000, Mandell et al. (2005) found that caregivers of children with autism reported that 18.5% of children had been physically abused and 16.6% had been sexually abused. Children who were physically abused were more likely to have engaged in acting out sexually, were in turn abusive, attempted suicide, or have conduct and academic problem. Those who were sexual abused were more likely to have had engaged in abusive behaviors, acting out sexually, self-injurious behavior, attempting suicide, running away, or having a psychiatric hospitalization, with sexual acting out, running away, and suicidal attempts persisting.

Despite the interference of autism symptoms with the acquisition of appropriate sexual knowledge and the added impact of the associated risk factors, children and adolescents with ASD physically develop the same as neurotypical, same-aged peers (Koller, 2000; Sullivan & Caternino, 2008). This includes typical physical development as well as the development of interests in pursuing friendships and romantic relationships. The mismatch between typical adolescent development and the atypical understanding and acquisition of appropriate sexual knowledge may lead to inappropriate relationship pursuit strategies, inappropriate social interactions, and at times, even sexual offenses. Inappropriate sexual behaviors may be exhibited because, although sexual drives that emerge during adolescence are occurring, the

understanding of social norms that govern appropriate sexual behavior is impaired (Sullivan & Caterino, 2008).

Overall, the research has shown that there is a high degree of interest in sexuality and engagement in sexual behaviors among individuals with autism spectrum disorders (Haracopos & Pedersen, 1992; Koller, 2000; Kontstantareas & Lunskey, 1997; Ousley & Mesibov, 1991; Sullivan & Caterino, 2008; VanBourgondien, Reichle, & Palmer, 1997). In contrast to early misconceptions, the social deficits evident in those with ASD do not negate the development of sexuality and the accompanying desires and behaviors. There is a need to better understand the sexuality of adolescents with ASD so that they may be better served by their caregivers regarding this area. Future research should examine diverse populations of adolescents, including those with varying cognitive abilities, communication skills, and comorbid conditions. There is also a need to understand and appropriately approach, in a developmentally appropriate way, sexuality education for these individuals and their families so that their needs can be met and deviant behaviors can be prevented and improved.

### **Intervention Delivery of Sexual Knowledge**

The Sexuality Information and Education Council of the United States (SIECUS), has created National Sexuality Education Standards (2012). The goal of the national standards outlined by SIECUS is: “To provide clear, consistent and straightforward guidance on the essential minimum, core content for sexuality education that is age-appropriate for students in grades K–12” (p. 9). SIECUS outlines the following topics that should be included at minimum for an effective sexuality education curriculum:

- ***Anatomy and Physiology*** provides a foundation for understanding basic human functioning.
- ***Puberty and Adolescent Development*** addresses a pivotal milestone for every person that has an impact on physical, social and emotional development.

- ***Identity*** addresses several fundamental aspects of people's understanding of who they are.
- ***Pregnancy and Reproduction*** addresses information about how pregnancy happens and decision-making to avoid a pregnancy.
- ***Sexually Transmitted Diseases and HIV*** provides both content and skills for understanding and avoiding STDs and HIV, including how they are transmitted, their signs and symptoms and testing and treatment.
- ***Healthy Relationships*** offers guidance to students on how to successfully navigate changing relationships among family, peers and partners. Special emphasis is given in the *National Sexuality Education Standards* to the increasing use and impact of technology within relationships.

***Personal Safety*** emphasizes the need for a growing awareness, creation, and maintenance of safe school environments for all students (p. 10).

There are several philosophies and proposed guidelines for delivering basic sexual education knowledge to children and adolescents, particularly in the school setting. Koller (2000) states that "The goal of sexuality education should be to protect the individual from sexual exploitation, teach healthy sex habits, and increase self-esteem through systematic, individualized approaches. Education needs to be provided with consistency and common-sense. It will need to be on-going, and will need to constantly reinforce appropriate behaviors" (p. 131).

Although sex education is important and impacting in the lives of adolescents, current sex education curriculum is often described as indirect and vague, having to rely on euphemisms and expressions (e.g., the birds and the bees) to relay information and to describe behaviors (Boehing, 2006; Tissot, 2009). While this may or may not suffice for a general population, difficulties in understanding these social nuances and inexplicit methods of delivery may arise for youth with ASD. Determining the content and methods of delivery is difficult for a general population and there is an added complexity when considering those who must receive the information who have disabilities like ASD.

### **Modification for Autism Spectrum Disorders**

In order to promote independence and facilitate the acquisition of socially appropriate behaviors, teaching and reinforcing skills for children and adolescents with disabilities is necessary (Murphy & Elias, 2006). There are several challenges or barriers that become apparent in an effort to implement programming in a way that effectively reaches children with ASD. Through a series of case studies, Tissot (2009) identifies that possible challenges include the attitudes of the society and/or culture of the individual, the manifestation of autism in the adolescent as well as any comorbid conditions, the parents' or caregivers' personal belief systems, and the challenges that teaching a private activity involves and the restrictions that governing agencies place on the teaching of and displaying of any activity of a sexual nature.

Being culturally responsive is universally important for professionals, especially when working toward teaching children topics that may be perceived as sensitive. Validating and including societal and personal beliefs of the family, while teaching appropriate material to the child will be challenging but necessary for the child's benefit. Because ASD presents differently from individual to individual, it will be important to present curriculum content using specific strategies that will address the deficits and capitalize on the strengths of each individual. Additionally, content should be developmentally and age appropriate and should address the specific areas of need for each child. Because sexuality can be perceived as a sensitive topic, it may be difficult for administrators and professionals to teach. Personal bias and beliefs should be acknowledged and feelings of discomfort managed when working in the field. Finally, governing agencies such as school districts or unions may be particular about the nature of the content. For example, pictures and videos have been shown to be useful for use with children with ASD; however, might be restricted or need approval before being able to be used. Not only will working around these challenges and barriers be necessary, but also a working knowledge of what to include in the actual content of lessons must also be determined.

After a review of the literature, Travers and Tincani (2010) argue that because of the increased risk for children and adolescents with ASD to experience abuse, sex education for adolescents with ASD is important tool in the prevention of sexual abuse. Additionally, sex education is important for the facilitation of future goals, such as developing relationships, marriage, and parenthood, preventing challenging behavior and promoting healthy hygiene.

Helleman et al. (2007) and Haracopos and Pedersen (1992) recommend that sexual education for individuals with autism should be delivered on a regular basis and that instruction should be individualized based upon issues that are specific to an individual's diagnosis, given the broad range of ability levels present in Autism Spectrum Disorders. Additionally, curricula should include the prevention of sexual victimization, focus on healthy behaviors, and the increase of self-esteem (Haracopos & Pederson, 1992). Gabriels and Van Bourgondien (2007) note that well prepared parents and caregivers with a proactive approach, or introducing basic and individualized concepts prior reaching puberty will be an effective way to facilitate transition into adolescence as well as prevent any difficulties that may present themselves without the basic foundational knowledge and skills.

Similar to the way that academic concepts are taught, basic concepts of social aptness must be learned and mastered before one is able to successfully move on to the more complex concepts (Murphy & Elias, 2006). For example, one is not able to understand and successfully initiate relationships without first having a mastery of basic self-care, hygienic needs, as well as a working knowledge of basic sexual education. There are techniques, strategies, and modifications used to better facilitate the delivery and acquisition of basic sexual education for children and adolescents with ASD (Murphy & Elias, 2006). Particularly, modifications may include role playing scenarios, use of concrete visuals, social stories, video modeling, delivery in a small group setting and the use of a structured routine.



Koller (2000) emphasizes that instruction should be concrete, specific, brief and repetitive. Additionally, activities should incorporate imitation and role play, and take place in naturalistic settings. Reinforcement for desired behavior as well as immediate redirection or other behavioral techniques for inappropriate behaviors should occur. Koller (2000) also suggests that the curriculum and instructional techniques be individualized at developmentally appropriate levels for participants. For instance, an important component of social and sexual maturity is mastery of basic hygiene and self-care tasks. Typically developing children are able to independently complete self-care tasks by approximately 8 years of age. However, children and/or adolescents with developmental disabilities may need frequent prompting, supervision to ensure appropriate technique and completed behaviors, assistive technology, formal instruction, practice, and reinforcement to master these self-care activities (Murphy & Elias, 2006).

Additionally, a social component of learning should be considered when delivering sexual education to students with ASD. Rules that govern sexual behavior are subtle and implicit and can be understood by most typically developing individuals. However, for the ASD population, directly addressing these is critical (Hattan & Tector, 2010; Sullivan & Caterino, 2008). The social deficits characterized by ASD make it difficult for children and adolescents to gain an understanding of these social rules through informal interpersonal interactions and thus, appropriate social expectations must be explicitly taught. For example, a typically developing adolescent male might understand that it is against social convention to initiate conversation with others in private areas such as restrooms; however, it may be necessary to explicitly teach an adolescent with an ASD that this is not an appropriate place to engage another in conversation. Additionally, Stokes (2012) suggests incorporating formal opportunities for adolescents with ASD to engage in social events (i.e. organized trip to a ball game) to practice, given their social deficits.

It is also important to include in sexual education curriculum discussion of social desires of the students (Travers & Tincani, 2010). Stokes and Kaur (2005) report that failure to address the social desires of individuals with ASD can increase inappropriate behavior, including apparent obsessions with other individuals, inappropriate sexual expressions such as public undressing, and aggression. In a study by Hattan and Tector (2010), basic building blocks included into curriculum and delivery of sexual and relationship education should include that which is specifically and individually important to children and adolescents with ASD to learn. With an emphasis on an awareness of a sense of self and how each individual's own autism impacts interpersonal relationships, Hattan and Tector (2010) recommend topics based on semi-structured clinical interviews from individuals with autism. Topics such as masturbation, menstruation, relationships of different kinds, relationships that include sex, clean and dirty, public and private, health issues, and touch and personal safety as topics for inclusion in curricula.

Sullivan and Caterino (2008) suggest a comprehensive sexual education curriculum for children and adolescents with ASD which includes: body parts and function; physical maturation; personal hygiene and self-care; health; appropriate social and sexual behavior; privacy issues; understanding emotions and impulses; self-image; abuse prevention; assertiveness; attraction; and interpersonal relationships as is developmentally appropriate for the individual. Similarly, Murphy and Elias (2006) recommend that an appropriate program for the sexual education of children and adolescents with ASDs would include body parts, pubertal changes, personal care and hygiene, medical examinations, social skills, sexual expression, contraception strategies, and the rights and responsibilities of sexual behavior.

### **Existing Curricula**

There is little attention paid to sex education programming for children and adolescents with autism, as compared to the literature base for these types of problem for those with Intellectual Disability (ID). Unfortunately, programs that target those with ID are inefficient for use for those with ASD due to the different natures of the disorders. There are few existing programs designed with the intention of use for the ASD population.

The TEACCH program, which began as a comprehensive program to service children with ASD (Schopler, 1997; Schopler, Mesibov, & Hearsey, 1995), outlines a developmentally sequenced curriculum of four tiers that are presented to the individual based on his or her cognitive ability. High functioning students might receive all four levels, while lower functioning students may receive just the first level. The first level focuses on developing appropriate habits through the use of behavior modification. The second focuses on issues of proper personal hygienic care. The third focuses on basic sexual education, including an understanding of anatomy. The final level focuses on development of different kinds of social relationships (Sullivan & Caterino, 2008). The TEACCH program emphasizes collaboration with parents to enhance the program, as well as the use of discrimination training, role play, overcorrection, and restitution (Schopler, 1997; Schopler, Mesibov, & Hearsey, 1995).

The Devereux Centers have also created a multi-tiered curriculum that operates on the principles that parents are the best sex educators and teachers should fill this role if necessary and that healthy sexual expression is normal and natural for every person regardless of functional ability level. Topics of instruction include body parts, reproduction, birth control, sexual health, sexual life cycle, gender roles, dating, marriage, parenting, establishing relationships, abuse awareness, respecting boundaries, self-esteem and assertiveness. Teaching methods include immediate situational instruction, as well as audio visual material and discussions for higher functioning students (Koller, 2000).

The Benhaven School is a residential facility for severely impaired individuals which offers individuals sexual education and training. Their policy includes teaching socially acceptable behavior that includes identification of body parts, menstruation, masturbation, physical examinations, personal hygiene and social behavior. Because students at this particular program are very low functioning, topics such as dating, marriage, birth control, and childbirth are considered beyond the scope of the needs of the students and therefore, are not addressed. Teaching methods include individualized and group strategies depending upon the needs and skill levels of the child (Melone & Lettack, 1985).

The *Taking Care of Myself* curriculum (Wrobel, 2003) was developed for young people with ASD ages five through 18. It includes seven units that are sequential in nature and include topics such as hygiene, health, modesty, growth and development, menstruation, touching and personal safety, and masturbation. The curriculum does not include information on sexual intercourse, reproduction, sexually transmitted infections, or contraception. The curriculum suggests use of several well documented techniques such as the use of Social Stories, visual and tactile aids, and computers to supplement the curriculum to address communication and language needs of its target population. The effectiveness of the curriculum has not been empirically investigated to date. Those using the curriculum are required to supplement it with their own materials and must find additional curricula should the topics of intercourse, pregnancy, and childbirth wish to be addressed.

### **Summary**

Based on the symptoms of ASD, which interfere with successful sexual knowledge acquisition coupled with the additional risk factors that children and adolescents with ASD face, there is a need for interventions that have been shown to be effective in facilitating appropriate sexual knowledge acquisition and increase appropriate social and interpersonal interactions in

children and adolescents with ASD. With effective sex education curricula, children and adolescents with ASD will be able to have an understanding about the nature of the changes and desires they experience, there will be a prevention of problem behaviors reported to accompany adolescents with autism, and children and adolescents will be able to appropriately pursue relationships with others, both friendly and romantic, for an overall more pleasurable life.

While the available literature concerning sex education for individuals with autism is limited, there is evidence to support that an individual with autism is able to learn and benefit from thoughtfully prepared instruction that is individualized and respectful of the individual. The existent literature regarding adolescents with autism spectrum disorders and their sexuality, however, is scarce. There is limited knowledge reported in the literature about the sexuality in individuals with autism without any comorbid disorders, and even less so about the knowledge, attitudes, and behaviors of adolescents with ASDs surrounding their sexuality. Specifically, the literature is limited by samples of adults and/or institutionalized samples. There exists a gap in the knowledge base about the sexuality of adolescents with autism who are not institutionalized; therefore, there is a need to investigate this population further to determine what is important and appropriate to include within treatment plans and sex education curricula.

Existing curricula are theoretically sound; however, they have not been empirically investigated and therefore there is a need to examine the effectiveness of sex education programs designed to target the ASD population. There is also no research to date that examines the effectiveness of sex education curricula specifically designed for children and adolescents with ASD administered in school settings. Consequently, it is necessary to examine the effects of a specifically designed instructional program in the successful acquisition and retention of sexual knowledge in older children and adolescents who have autism spectrum disorders.

## CHAPTER III

### METHODOLOGY

The purpose of this study is to determine whether or not the established intervention program, *Healthy Relationships* (HR; Sutton & Wesley Spectrum Services, 2013), is effective in the knowledge acquisition and knowledge retention of adolescents with Autism Spectrum Disorders. The study has examined the knowledge acquisition and retention of a sample of adolescents based the results of a pre- and post-intervention test. After having obtained mastery of the material, subjects' knowledge retention was assessed by follow up retention probe data. Participants in the study were previously diagnosed with an Autism Spectrum disorder according to the DSM-IV-TR (APA, 2000) diagnostic criteria and were specifically chosen for inclusion into the intervention by a familiar caregiver, therapist, or parental concern or dictation of need. Intervention services were delivered through Wesley Spectrum Services (WSS), a service organization designed to serve youth and families who have Autism Spectrum disorders. Below is a description of WSS and the participants in the study, including recruitment procedures for participation. Procedures for administering measures, implementing intervention, and collecting data are outlined. Psychometric properties are provided, and lastly, research methodology and data analyses are discussed.

#### **Setting**

Wesley Spectrum Services is a nonprofit organization that services youth and families throughout Western Pennsylvania. Wesley Spectrum Services offers an array of services and programs, including outpatient services and school based programs, in order to serve the needs of at-risk youth and their families who are dealing with Autism Spectrum Disorders, Emotional Disturbances, and/or behavioral health disorders. For the purposes of this study, only participants diagnosed with an ASD and included in the school based autism services program

were examined. Participants in the study were chosen and invited to participate based on specific need for the intervention as determined by a familiar caregiver, school-based therapist, or parent. Consent and assent for participation were obtained for each individual prior to the start of receiving services.

## **Participants**

The participants in the study were recruited through Wesley Spectrum Services school-based autism services program and invited to participate based on a specific individual need for the intervention. Need for the intervention was determined by the perception of individual need of the intervention dictated by a familiar caregiver, school-based therapist or parent. Other inclusionary criteria for participation in the study included a previous diagnosis of an Autism Spectrum Disorder according to the DSM-IV-TR (APA, 2000) diagnostic criteria. In addition, for the purposes of the current study, each participant must have achieved a mastery level score (i.e., 85%) on the HR curriculum's first module posttest, which is a prerequisite for participation in the HR curriculum's second module. In other words, it is not appropriate for participants to receive Module 2 material, without having demonstrated mastery of the curriculum's Module 1 material, due to the developmentally sequenced nature and design of the HR curriculum.

There were six White, male participants ranging from ages 15 to 17 recruited from grades 9 to 11 to participate in the study. According the Child Autism Rating Scale- Second Edition High Functioning Version (CARS2- HF), one participant exhibits minimal symptoms of autism, four participants exhibit mild to moderate symptoms of autism, and one participant exhibits moderate to severe symptoms of autism. All participants partook in the school based autism program as well as participated in specially designed instruction in the same classroom.

## **Intervention**

The effects of the HR curriculum on the acquisition and retention of biological sex education were compared in this study. The goal of the curriculum is to provide mental health professionals and educators with a structured group intervention that provides opportunities for students to learn relevant and necessary facts about healthy, normal development and the pursuit and maintenance of appropriate relationships with others. This includes a focus on basic self-care and hygiene, basic biological sex education, and a focus on friendships and other relationships. The psychoeducational curriculum is delivered in a small group format, utilizing modified instructional techniques to allow teaching and experiential practice that would be easily received by children and adolescents with an ASD (e.g., visual aids, concrete instruction, role plays, etc.)

The HR curriculum is a developmentally sequenced, three module curriculum designed to assess and teach Basic Hygiene, Basic Biological Sex Education, and Relationships. The established curriculum is facilitated by a male and a female therapeutic staff member. Facilitators receive training and weekly supervision throughout the duration of the intervention. Each lesson of the curriculum lasts approximately 45 minutes and is presented in a small group format. Each group receiving the intervention consists of approximately 5-8 students, and each student must demonstrate mastery of the given material of each module before he or she is able to move to the material in the next module. Achievement of mastery is demonstrated by correctly answering at least 85% of the questions in the module posttest.

The first module of *Healthy Relationships* focuses on basic hygiene. Upon completion of the pretest, there are two introductory sessions designed to establish group rapport and cohesion, develop rules for members of the group to follow, and to review confidentiality. There are six lessons of content following the introductory sessions. The next six lessons include content



related to hand washing, showering and bathing, proper dental care, toileting, bedroom organization, and privacy. The module concludes with a posttest.

Assuming the students have achieved mastery of module one material, they move onto module two, which is basic biological sex education. Upon completion of the pretest, there are six lessons addressing basic biological sex education. These include an introduction to puberty, puberty, male genitalia, female genitalia, intercourse, and pregnancy and childbirth. The module concludes with a posttest.

Upon achieving mastery of the information in module two, students move onto module three, which has a focus on developing relationships. Developing Relationships includes 23 lessons which address topics such as differentiating between friends, acquaintances, and bullies, small talk, private talk, showing appropriate affection, dating, and social media and internet safety. A posttest is again given to the students upon completion of the third module to assess the level of knowledge acquisition of the Developing Relationships module.

## **Measures**

### **CARS2-HF**

Participants in the study were compared with each other on a battery of psychological measures (e.g., behavioral, mood, symptomology, cognitive ability, knowledge acquisition and retention, etc.) that routinely accompany the HR curriculum. In order to differentiate the severity level of autism spectrum disorder symptomatology of the participants, the Child Autism Rating Scale - Second Edition High Functioning Version (CARS2- HF) was used from the battery. The CARS2-HF categorizes scores into one of three severity groups: Minimal to No Symptoms, Mild to Moderate Symptoms, and Severe Symptoms. Participants' severity category were designated high, moderate, or low functioning group for the purposes of the study

The CARS2-HF is a 15 item rating scale used to identify children with autism and distinguish them from developmentally disabled children who do not have an ASD. The rating scale provides quantifiable ratings that are based on direct behavior observation and includes items that are more responsive to individuals who are on the high functioning end of the spectrum (e.g., higher average IQ scores, better verbal skills, more subtle social deficits, etc.). The CARS2-HF also distinguishes placement on the spectrum, assists in integrating diagnostic information, helps to determine functional capabilities, provides feedback to parents, and helps to design targeted interventions. The rating scale utilizes psychological testing, classroom participation, parent reports and history records (Schopler, Van Bourgondien, Wellman, & Love, 2010).

The CARS2-HF provides a total raw score from each of the 15 items, which then are categorized into severity groups. Minimal to No Symptoms of Autism Spectrum disorder consists of 15-27.5 raw score points. This translates to a less than or equal to a T-score of 41 and is less than or equal to the 19% percentile. The Mild Moderate Symptoms of Autism Spectrum Disorder severity group is 28-33.5 raw scale points, a T-score between 42 and 50 and falls within the 21-50<sup>th</sup> percentile. Finally, the Severe Symptoms of Autism Spectrum Disorder severity group has 34 or higher raw score points, a T-score of 51 or higher, and a percentile rank of 54% or higher (Schopler, Van Bourgondien, Wellman, & Love, 2010).

The rest/retest reliability for 91 cases assessed one year apart is a correlation of .88. From the second to third retest, the coefficient kappa is .64, which may be attributed to developmental improvement through each year's retest (Schopler, Van Bourgondien, Wellman, & Love, 2010). The internal consistency, as measured by Cronbach's coefficient alpha, was .94. The interrater reliability for two raters of 280 subjects is .71. The most closely correlated item was I > Relating to People (correlation of .93). The weakest correlation for the two raters was .55

for item XIV. When comparing CARS diagnoses to those made independently by clinicians, diagnoses correlated at  $r = .80$ . Additionally, agreement across conditions of parent interview versus direct observation is  $r = .83$ .

### **Pre/Posttest**

The pre/posttest for Module 2 was designed to assess knowledge related to basic biological sex education. Items on the test require participants to identify basic male and female reproductive anatomy, correctly identify definitions of biological vocabulary words, identify appropriate terms when given slang terms, and answer true or false questions concerning module content. According to the HR manual, the pre/posttest is given prior to the first lesson in Module 2, immediately following the conclusion of module 2, and at several points in time after the completion of Module 2 to assess participant retention of the basic biological sex education material (Sutton & Wesley Spectrum Services, 2013).

### **Research Design**

A quasi experimental, repeated measures design was within the study. A figure of the experimental design is presented in Figure 3.1 below. Quasi-experimental designs are common when randomization of the participants is impractical (i.e., participants requiring differential treatment for basic biological sex education; McMillan & Schumacher, 2010). Therefore, the assignment of treatment is an option for the study in the quasi-experimental design. Participants were recruited through Wesley Spectrum services and assigned treatment of the HR curriculum based on a perceived level of need by familiar caregivers, teachers or parents. For the purpose of the study, and due to the factual nature of the content area, the independent variable is the second module of *Healthy Relationships*, which covers basic biological sex education. The dependent variables are the level of knowledge acquisition and knowledge retention. Knowledge acquisition was measured by the scores earned by the participants on the initial posttest at the

immediate conclusion of Module 2. Knowledge retention was measured by probing the participants with the same post test at several other time points following the completion of Module 2.

Group	O <sub>1</sub>	X	O <sub>2</sub>	O <sub>3</sub>	O <sub>4</sub>	O <sub>5</sub>	O <sub>6</sub>	O <sub>7</sub>
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**Figure 3.1 Graph of Repeated Measures Research Design.**

All participants, regardless of functioning level, were given the posttest at several points in time following the conclusion of module two. Specifically, it was proposed that the participants were given the posttest immediately following the conclusion of module 2, in the middle of Module 3, at the end of Module 3, three months following the program, 6 months following the program, and 9 months following the program.

### **Internal and External Validity**

Internal validity for the study was difficult to ensure given the use of a nonrandomized sample. However, the structured 6 sessions of Module 2 that are delivered in a developmentally sequenced manner increases the certainty that the intervention were implemented as intended and with fidelity. The design requires a nonrandomized sample; rather, the participants were specifically selected based on their need for the treatments that severely threatens external validity. However, the sample within the study, with their varying ability levels and previous ASD diagnoses, are representative of the population for which the HR curriculum was developed. In addition, there is such limited data available in the literature regarding this topic that the study will be able to serve as a starting point for understanding pertinent knowledge acquisition and retention of children and adolescents with an ASD.

Potential threats to internal validity also include experimenter effects, by the way that the curriculum facilitators present the content of the module. For example, the content of the curriculum and specifically in module two are often taboo and/or uncomfortable topics to approach. Additionally, the material itself is difficult to understand, further threatening internal

validity of the study. This potential threat is addressed, however, by the extensive week- long training that in which facilitators participate to learn and understand the correct differentiated instructional techniques that the curriculum uses for children and adolescents with an ASD as well to gain an understanding of the actual factual material presented in the curriculum. This training ensures that facilitators are competent in the understanding of the curriculum content and that facilitators present the material in an appropriate manner. Pretest sensitization, or the improvement of performance from having taken a pretest, may also be a threat to internal validity in this study, especially given the factual information that may be recalled (Brown, 2007). Finally, a small sample size and attrition are possible threats to validity given the length of the study (i.e., 3, 6, and 9 month follow up after the program ends).

### **Procedure**

After receiving Institutional Review Board approval, children and families were contacted and recruited, having been informed of the opportunity to participate in the research project. A parent consent was obtained that explained the purpose of the study and included the information that results would be used by the examiner in a research project that focuses on understanding and treating social sexual delays in adolescents with ASD. Parents were guaranteed confidentiality, as their children would not be personally identified as a participant. Parents were additionally assured that participation in the study is voluntary and that parents or children could withdraw at any time. In addition to parental consent, an assent form was also obtained, explaining informed consent and assent. Prior to starting the intervention modules, each participant completed a comprehensive psychological evaluation to confirm diagnosis of an ASD. The evaluation was administered individually and results were available to the family upon request.

Participants progressed through the modules sequentially in a cohort model and remained with the module until a level of competence of knowledge and skill was achieved (i.e., 85% correct on the module posttest). Lessons were presented once or twice a week by facilitators, and each session lasted approximately 40-50 minutes, or the equivalent of one class period per session. Modified, differential instruction techniques were used to keep group members progressing at the same or similar rate. Individual remediation was provided as needed for assistance to assure minimum competency. No assumptions of prior knowledge were made; rather, all participants completed all module content. Posttest material indicated when the group was ready to move to the next module. Each module was supplemented with the text, *It's Perfectly Normal: Changing Bodies, Grouping Up, Sex, and Sexual Health*, by Robie H. Harris and Michael Emberley (1994). Each family had access to materials and the content taught in each lesson. Upon completion of each lesson, a home supplement outlining the material that was taught was sent home to parents with encouragement to follow up, practice new skills, and discuss new content learned.

### **Data Collection**

Data collected were stored in a locked facility. When entered electronically, data were de-identified with a legend that was locked in a separate location. For the purpose of this study, data collection consisted of the module two pretest and several posttests given at the immediate end of the module as well as at several points in time after the completion of module two. Please see the table below for the pre/post test data collection schedule for module two.

**Table 3.1**  
***Module 2 Data Collection Schedule***

<b>1<sup>st</sup> Measure of DV</b>	<b>Exposure to Treatment</b>	<b>2<sup>nd</sup> Measure of DV</b>	<b>3<sup>rd</sup> Measure of DV</b>	<b>4<sup>th</sup> Measure of DV</b>	<b>5<sup>th</sup> Measure of DV</b>	<b>6<sup>th</sup> Measure of DV</b>	<b>7<sup>th</sup> Measure of DV</b>
Module 2 Pre-Test	HR Module 2	Module 2 Posttest	Module 2 Posttest- mid Module 3	Module 2 Post- End Module 3	Module 2 Posttest- 3 months after completion	Module 2 Posttest- 6 months after completion	Module 2 Posttest- 9 months after completion

## **Data Analysis**

Research question 1a investigated whether or not the HR curriculum is effective in the initial knowledge acquisition of basic biological sexual education for children and adolescents with an ASD. A paired samples t-test was used to determine whether or not there was a significant increase in score from pretest to posttest for all participants, regardless of functioning level. A paired samples t-test was chosen given the hypothesis that knowledge retention would increase.

Research question 1b investigates whether or not the participants in the HR curriculum achieved mastery of the module content as measured by at least an 85% correct on the initial posttest following the completion of Module 2. Descriptive statistics were reported to describe the number of students of all functioning levels who met mastery criteria (i.e., 85% correct on initial posttest). Specifically, frequency and percentage data are reported.

Research questions 2a and 2b investigate whether or not the HR curriculum is effective for the retention of basic biological sex education knowledge children and adolescents with an ASD of all functioning levels. A two way, repeated measures analysis of variance (ANOVA) was used to determine the extent of the effect of the HR curriculum on knowledge retention. Differences in means both within and across groups across the different time points were examined. That is, both the main effects of the repeated measures ANOVA and the interaction effects were examined to determine whether or not the intervention was successful for both

groups in knowledge retention. A probability level of .05 or greater was used to determine whether the null hypothesis should be accepted or rejected. Effect size calculation was used to determine the strength of the change after youth received the HR curriculum. In addition, frequencies are also reported to determine the number of students in each group who have achieved mastery criteria at each time sampling.

### **Research Questions and Hypotheses**

The *Healthy Relationships* curriculum was designed for children and adolescents with an ASD who require differential instruction and evidence based instructional techniques in order to acquire and retain knowledge necessary to pursue appropriate relationships for their developmental level. That is, theoretically, the programming should improve outcomes for groups, like the current sample, that require supplemental knowledge surrounding the topics of sexuality that are not able to be learned similarly to their neurotypical peers. As such, the aim of this study was to investigate the effectiveness of the established intervention program in the knowledge acquisition and retention of the participation in the sample. The goal is to expand the limited research within this area by describing the characteristics and needs of this group. Specifically, the study seeks to determine if the HR Curriculum was successful in increasing knowledge acquisition and retention of this group.

**Research Question 1a:** Does the *Healthy Relationships* program increase the knowledge acquisition of basic biological sexual education for children and adolescents with an autism spectrum disorder?

**Hypothesis 1a:** The *Healthy Relationships* program will significantly increase the knowledge acquisition of basic biological sexual education for children with and autism spectrum disorder.

**Research Question 1a Statistical Analysis:** Paired samples t-test.



**Research Question 1b:** Will the majority of participants in the *Healthy Relationships* achieve mastery of Module 2 content, as defined by 85% passing rate on the initial posttest?

**Hypothesis 1b:** The majority of participants in the *Healthy Relationships* program will achieve master of Module 2 content, as defined by an 85% passing rate on the initial posttest.

**Research Question 1b Statistical Analysis:** Descriptive statistics- frequencies and percentages.

**Research Question 2a:** Is the *Healthy Relationships* program useful in the retention of knowledge of basic biological sexual education for children and adolescents with an autism spectrum disorder?

**Hypothesis 2a:** The *Healthy Relationships* program will be useful in the retention of knowledge of basic biological sexual education for children and adolescents with autism spectrum disorder.

**Research Question 2 Statistical Analysis:** Repeated Measures ANOVA, effect size statistics, descriptive statistics, visual analysis.

**Research Question 2b:** Do the rates of knowledge and retention of basic biological sexual education vary based upon level of functioning for children and adolescents with and autism spectrum disorder?

**Hypothesis 2b:** Rates of knowledge and retention of basic biological sexual education will not yield significant differences between low, moderate, or high functioning children and adolescents with an autism spectrum disorder.

**Research Question 2b Statistical Analysis:** Repeated Measures ANOVA, individual visual analysis.

## **Summary**

Overall, the purpose of the current study was to investigate whether or not the *Healthy Relationships* curriculum was effective in both the initial acquisition as well as retention of basic biological sex education material that was presented in a way that is, theoretically, receivable to individuals with an ASD. The study participants were high school males participating in a school based autism service program supplementing their academic curricula. Each participant has a previous diagnosis of ASD and demonstrated mastery on the HR curriculum Module 1 posttest before participation in Module 2 began. Descriptive statistics, repeated measures ANOVA, and visual analysis were the main analyses were used to determine acquisition and retention of basic biological sex education material of the participants of varying functioning levels as measured by the CARS2-HF.

## CHAPTER IV

### RESULTS

The purpose of this study was to investigate the effectiveness of the *Healthy Relationships* curriculum in the acquisition and retention of basic biological sex education outcomes for children and adolescents of varying functioning levels across the autism spectrum. For the purpose of this study, severity of autism was determined using the CARS2-HF, which categorizes scores into one of three categories: Minimal to No Symptoms of Autism Spectrum Disorder, Mild to Moderate Symptoms of Autism Spectrum Disorder, or Severe Symptoms of Autism Spectrum Disorder. Additionally, Module 2 of the HR curriculum was assessed, which covers fact based content of basic biological sex education.

In the current study, participants across a range of functioning levels along the autism spectrum participated in the HR curriculum, and comparisons were made by way of pretest and posttest at the beginning and end of Module 2 in the curriculum. In addition, a follow up posttest was given after one month of the completion of Module 2 in order to assess whether participants retained the learned skills over time. Although the HR curriculum designates several follow up posttests to assess retention over a longer period of time (i.e., at the end of the curriculum, after 3 months, after 6 months, and after 9 months), the current study took place near the end of the school year in an approved private school setting, and therefore there was insufficient time to administer the remaining posttests.

In this chapter, the results are organized as follow: Demographic data and descriptive statistics are presented for the participants and variables in the study. These are reported in terms of aggregated means and standard deviations. Following the demographic data and descriptive statistics, the assumptions for each statistical test are examined in order to assess the appropriateness of conducting the primary statistical analyses for each research question.

Finally, the findings of the results are presented, beginning with a review of the results of the primary analyses, followed by an evaluation of the results and summary of the chapter.

## Demographics

The current study examines 6 Caucasian, adolescent males who were previously diagnosed with an ASD according to DSM-IV-TR (APA, 2000). All of the subjects participated in the same school based autism programming and are in the same self-contained classroom. Participants ranged from ages 15 to 17 years (mean age = 15.83 years). In order to determine placement on the spectrum, cutoff scores from the CARS2-HF measurements scale were used. One participant was categorized into the Mild to No Symptoms of Autism group, 4 participants were categorized as having Mild to Moderate Symptoms of Autism, and 1 participant was categorized as having Severe Symptoms of Autism. Demographic data for the entire sample are summarized in Table 4.1, below.

**Table 4.1**  
*Frequency Distribution: Demographics, Entire Sample*

	<i>N</i>	<b>Percent</b>
<b>Race - Caucasian</b>	6	100
<b>Gender - Male</b>	6	100
<b>Age- 15</b>	2	33.3
<b>Age- 16</b>	3	50.0
<b>Age- 17</b>	1	16.7
<b>CARS2HF- Minimal to No Symptoms</b>	1	16.7
<b>CARS2HF- Mild to Moderate Symptoms</b>	4	66.7
<b>CARS2HF- Severe Symptoms</b>	1	16.7

## Descriptive Statistics

Descriptive statistics, including frequency distributions, means and standard deviations were obtained for each pre or posttest variable within the study. As a pre-requisite to participating in Module 2 of the HR curriculum, participants must have achieved mastery of

Module 1 content (i.e., 24 of 28 questions correct or 85% correct on post-test). All participants achieved at least the minimum criteria of mastery on HR Module 1 content on their first posttest probe (mean posttest score= 26.83 questions correct, or 98%, SD= .98) and were therefore eligible to participate in Module 2 content. Because each participant achieved at least mastery on the first Module 1 posttest probe, no remediation of Module 1 content for any participant was necessary. Descriptive information including a frequency distribution of Module 1 Posttest is summarized in Table 4.2 below.

Prior to beginning Module 2 content, all participants were given a pretest to determine their baseline level of knowledge related to basic biological sex education. Pretest scores ranged from 29 (50%) to 51 (88%) question correct out of a total possible of 58 questions (Mean= 40.33, SD= 7.84). After Module 2 lessons, all participants were given a posttest. Initial posttest scores ranged from 43 (74%) to 57 (98%) questions correct out of a total possible of 58 questions. Of the 6 total participants, 3 (50%) participants achieved mastery of Module 2 content (i.e. 85% correct on posttest). Therefore, the remaining 3 participants who did not achieve mastery were given individual remediation on Module 2 content, and were then retested with an additional posttest. The 3 participants who received remediation and were retested had scores that ranged from 49 (85%) to 53 (91%) out of a total possible of 58 questions (Mean= 51.33, SD= 2.082), indicating that after receiving remediation, each participant demonstrated mastery of Module 2 content. Finally, all participants were given a follow up posttest at one month following the completion of Module 2 lessons in order to assess level of retention of Module 2 knowledge. Maintenance probe scores ranged from 45 (78%) to 55 (95%) questions correct out of the total possible 58 questions (Mean= 49, SD= 4.517). This indicates that, on average, the group maintained levels of initial knowledge acquisition at the mastery criterion mandated by the curriculum. Descriptive information for each of the Module 2 probes is

summarized in Table 4.3. Although the HR curriculum's schedule of data collection originally included several more follow up posttests to assess knowledge retention (i.e., immediately following the completion of Module 3, and 3, 6, and 9 months following completion of the program) further maintenance probes were unable to be given due to the academic year's end prior to the completion of the program. In addition, due to the nature of the setting and academic status of the participants, once the academic year had ended, there was no feasible way to continue to probe participants after they had left school.

**Table 4**  
***Frequency Distribution: Module 1 Posttest***

<b>No. Questions Correct (Percentage correct)</b>	<b>Frequency</b>	<b>Percent</b>
26 (93)	3	50.0
27 (96)	1	16.7
28 (100)	2	33.3
<b>Total</b>	<b>6</b>	<b>100.0</b>

*Note:* Mastery= 24 questions correct (85%)

**Table 4.3**  
***Descriptive Statistics: Module 2 Pretests, Posttests, Remediation, Maintenance Probes***

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Module2_Pre_Total	6	29	51	40.33	7.840
Module2_Post_Total	6	43	57	49.00	4.858
Module2_Rem1_Total	3	49	53	51.33	2.082
Module2_Maint1_Total	6	45	55	49.00	4.517

*Note:* Mastery= 49 questions correct. Pre=Pretest; Post=Posttest; Rem1= retest after remediation; Maint1= Maintenance posttest

### **Statistical Assumptions**

#### **Paired Samples *t*-test**

For research question 1a, a paired samples *t*-test was used to evaluate the influence of the HR curriculum on the participants' initial sexual knowledge acquisition by comparing the means of their pretest and initial posttest scores. For the paired samples *t*-test, it is assumed that the

differences scores are independent of each other, the dependent variable is measured on an interval scale, and the difference scores are normally distributed in the population. As none of these assumptions were violated, it appropriate to conduct a paired samples *t*-test.

### **Repeated Measures ANOVA**

For research questions 2a and 2b, a repeated measures analysis of variance (ANOVA) was used to evaluate whether the HR curriculum was effective in the retention of sexual knowledge of various functioning levels of ASD. The three major assumptions that need to be met when conducting an ANOVA include normality, independence, and homogeneity of variance. An addition assumption when conducting a repeated measures ANOVA includes sphericity or homogeneity of covariance. First, it is assumed that the dependent variable is normally distributed in the population for each level of the within-subjects factor. Second, the cases must represent a random sample from the population and there is no dependency in the scores between the participants. Third, the variances from each population are assumed equal. Finally, it is assumed the levels of the within subject variables are equally related to each other. Effect size was used to determine the strength of the effect of any changes detected in after the participants received the curriculum. Each of the assumptions of the repeated measures ANOVA were met.

### **Additional Analyses and Considerations**

Due to some practical limitations of the site, the initially proposed design included seven measures of the dependent variable to evaluate the effectiveness of the HR curriculum in the retention of sexual knowledge at several points, post Module 2 and post curriculum. Because the curriculum was implemented in the school setting, obvious limitations due to the academic year end. In this case, the academic year ended before more than a single maintenance posttest could be probed. There were no other opportunities to continue to probe for knowledge retention after

the end of the school year. In addition, due to the small sample size, and the possible complications with regard to low power that may result in a repeated measures ANOVA, visual analyses have been added into the evaluation of the results. Visual analyses were added in an effort to better understand the detected changes in the knowledge acquisition and retention of the six participants in the study.

## **Primary Data Analyses**

### **Research Question 1a Results**

A paired samples t-test was conducted to evaluate whether there were significant differences between participants' pretest and initial post test scores. The results indicated that the mean of the initial post test scores ( $M = 49$ ,  $SD = 4.86$ ) was significantly greater than the mean of the pretest scores ( $M = 40.33$ ,  $SD = 7.84$ ),  $t(5) = -3.585$ ,  $p = .016$ . Post hoc calculation of achieved power, given the sample size was computed using the G\*Power program version 3.7.1 (Faul, Erdfelder, Buchner, & Lang, 2009). Power = .92, indicating high probability of rejecting the null hypothesis when the alternate hypothesis is true. The standardized effect size index,  $d$ , was calculated using  $d = \text{Mean}/\text{Standard Deviation}$ , and is  $d = -1.47$ , indicating a large effect size. The 95% confidence interval for the mean difference between the two scores was -14.89 to -2.45. The results of the paired samples t-test are summarized in Table 4.4, below.

**Table 4.4**  
***Paired Samples t-test: Results, Question 1a***

	<b>t</b>	<b>df</b>	<b>Sig. (2-tailed)</b>
<b>Pair 1</b> Module2_Pre_Total - Module2_Post_Total	-3.59	5	.016*

*Note:* \* $p < .05$

### **Research Question 1b Results**



Research question 1b investigates whether or not the majority of the participants, regardless of functioning level, would achieve mastery of Module 2 material, as evidenced by passing the posttest with 85% correct. Descriptive statistics were conducted to determine whether the majority of participants achieved mastery on the first posttest. Results indicated that 3 (50%) participants achieved the mastery criterion on the initial posttest, and 3 (50%) of the participants did not reach mastery criterion on the first post test, thus needing individual remediation.

Of note, participants 1, 2, and 3 achieved mastery on the first posttest, and had CARS2-HF severity scores of: Mild to Moderate Symptoms of Autism, Mild to Moderate Symptoms of Autism, and Severe Symptoms of Autism, respectively. Participants 4, 5, and 6, did not achieve mastery on the first posttest, and had CARS2-HF severity scores of: Minimal to No Symptoms of Autism, Mild to Moderate Symptoms of Autism, and Mild to Moderate Symptoms of Autism, respectively. It should be noted that the errors on the tests were varied across participants, indicating that there were no evident systematic errors in either facilitation of lesson content or test material.

As mandated by the HR curriculum, participants 4, 5, and 6 received individual remediation on Module 2 content and were retested, as they are not permitted to move to Module 3 material without having achieved mastery of Module 2 (Sutton & Wesley Spectrum Services, 2013). After individual remediation, each of the 3 participants achieved at least an 85% passing rate on their second posttest. Table 4.5 summarizes individual participants' initial posttest scores, posttest scores after remediation where necessary, and CARS2-HF severity scores.

Table 4.5

*Participants' CARS2-HF Severity and Posttest Scores*

Participant	Cars Severity	Module 2 Initial Posttest Score (Percent Correct)	Module 2 Posttest Score After Remediation (Percent
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			Correct)
1	Mild to Moderate	57 (98)	-
2	Mild to Moderate	51 (88)	-
3	Severe Symptoms of Autism	50 (86)	-
4	Minimal to No Symptoms of Autism	43 (74)	52 (90)
5	Mild to Moderate	47 (81)	53 (91)
6	Mild to Moderate	46 (79)	49 (85)

*Note:* Mastery= 49 questions correct.

### Research Question 2a

In research question 2a, the researcher is investigating whether or not the HR curriculum is effective in the knowledge retention of basic biological sex education, after the knowledge has first been acquired. Due to the curriculum's mastery criterion, the final mastery score, whether it was the initial posttest score or the score from the retest after receiving remediation, was used in the analysis. In order to measure knowledge retention, the participants must have first acquired the knowledge based on the curriculum's 85% passing rate on the posttest. Everyone achieved mastery, either on their first posttest try, or on their second posttest try after having received remediation. That is, a new variable was created for the analysis that included either the initial post test score of the 3 participants who achieved mastery on the initial posttest or the remediated test score of the 3 participants who needed remediation. The new variable has been named "Mastery." This is an important note because the purpose of the question is to measure retention after acquisition, therefore, the level of each individual's mastery is used to compare against each individuals level of retention, one month post Module 2.

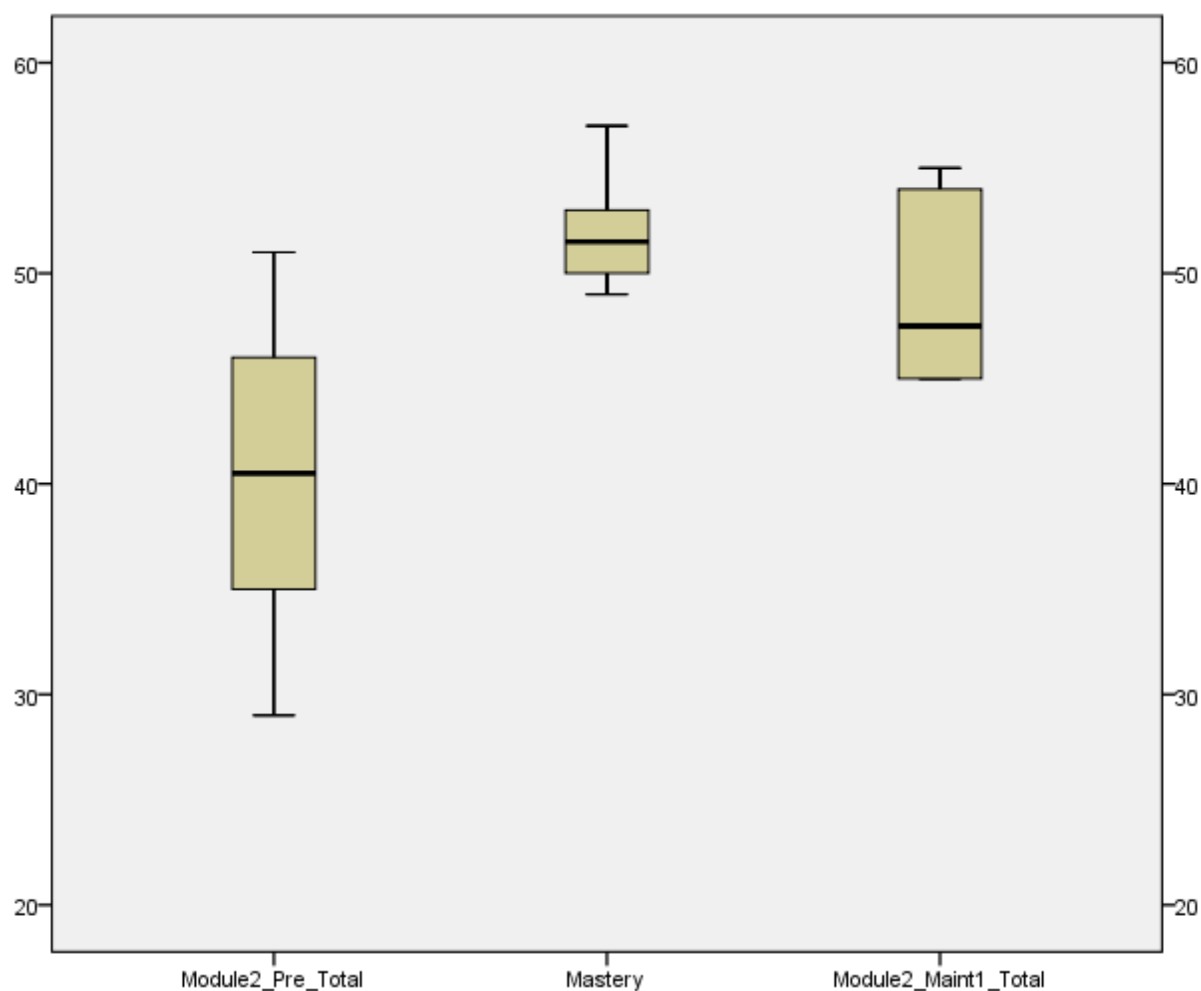
A one-way, repeated measures ANOVA was conducted to investigate the hypothesis that the HR curriculum would be effective in the increasing and maintaining knowledge acquisition as measured by three points in time including: a pretest prior to receiving the module, the post-test that indicates initial mastery criterion knowledge acquisition, and a second post-test given one month prior to module 2 content. With regard to the second post-test, it was hypothesized that participants would maintain knowledge acquisition at the mastery level (i.e., 85% passing

rate). Results of the Mauchley's test of Sphericity indicated that the assumption of sphericity was not violated ( $W = .376, p = .141$ ). Table 4.6 summarizes the descriptive statistics of the within subjects model. Results of the repeated measures ANOVA indicated a significant main effect, Wilks'  $\lambda = .22, F(2,4) = 7.08, p = .049$ , partial  $\eta^2 = .78$ , observed power = .61.

**Table 4.6**  
***Descriptive Statistics Repeated Measures ANOVA***

	Mean	Std. Deviation	N
<b>Module2_Pre_Total</b>	40.33	7.840	6
<b>Mastery</b>	52.00	2.828	6
<b>Module2_Maint1_Total</b>	49.00	4.517	6

Pairwise comparisons were examined to determine between which specific time points there were significant change. Results indicated significant change between the Pre-test to each person's Mastery level post-test (Mean difference = -11.67,  $p = .01$ ). From the Mastery time point to the Maintenance probe at one month out, there was not a significant change. The mean difference of 3,  $p = .07$ , indicated that although scores went down, they did not decrease significantly. In other words, participants retained their initial knowledge acquisition at an average level that meets mastery criterion as mandated by the HR curriculum (Sutton & Wesley Spectrum Services, 2013). Figure 4.1 depicts the results of the one way, repeated measures ANOVA.



**Figure 4.1. Boxplots for Each Time Point. Y-axis= mean number of questions correct.**

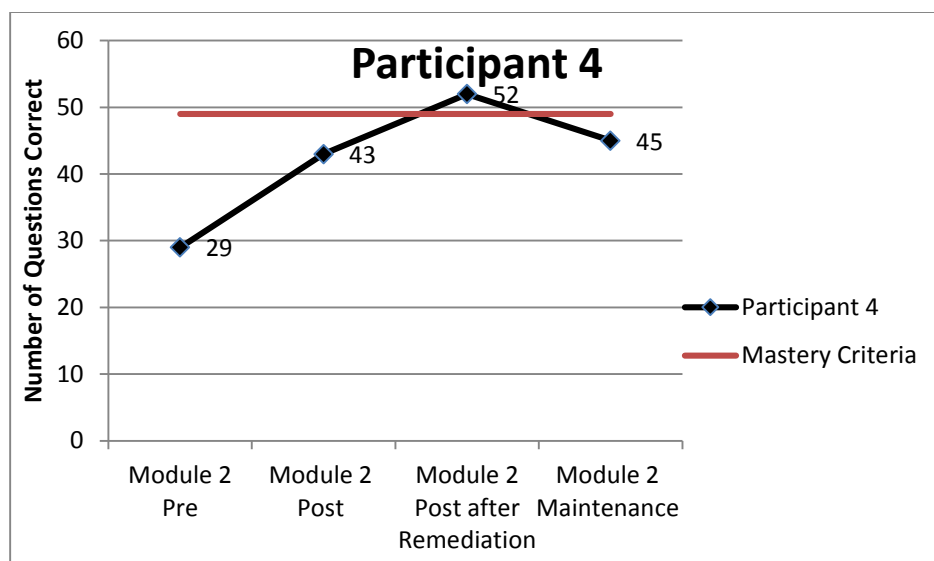
## Research Question 2b

Research question 2b investigates whether or not the HR curriculum is effective in the knowledge acquisition and retention for students at varying functioning levels across the autism spectrum. Results of research question 2a indicate that the *Healthy Relationships* curriculum is effective in promoting the knowledge retention of participants who present in a wide range across the autism spectrum, as a group.

A three-way repeated measures ANOVA defined by three groups as categorized by their CARS2-HF scores was the originally intended analysis to conduct in order to investigate this research question. However, given the small sample size, the statistical power of the analysis

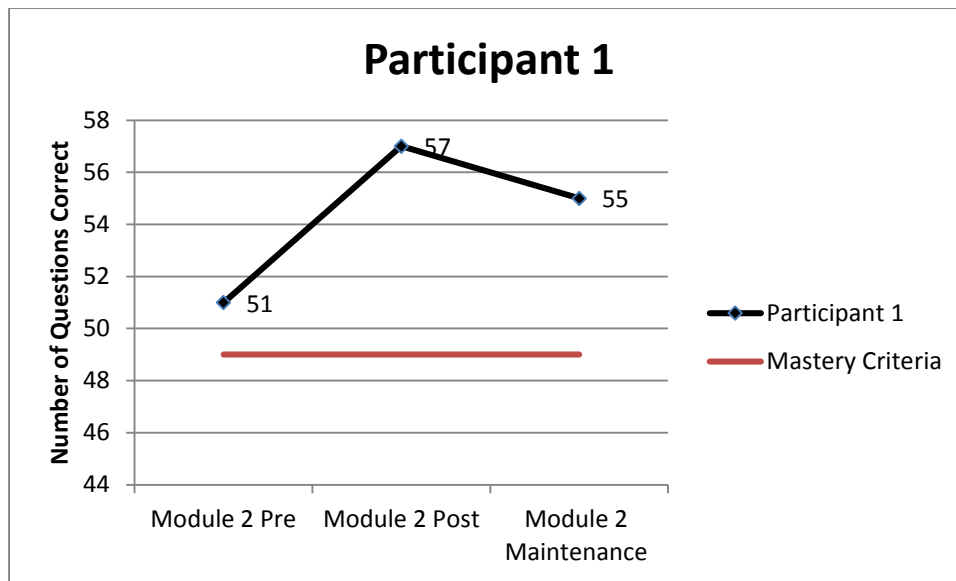
would not be enough to warrant meaningful interpretation. Statistical power is the probability of a test correctly rejecting the null hypothesis when it is false and is greatly affected by the sample size. That is, the higher the sample size, the higher the power and probability that the null is rejected correctly. Instead of the 3 way, repeated measures ANOVA, however, visual analysis has been added for each individual participant to help understand knowledge acquisition and retention in more depth in light of each individual's ability levels. In addition, the percentage of nonoverlapping data was employed to further ensure careful visual analysis. The less overlap there is between data points, the more effective and reliable the intervention is considered to be.

**Minimal to no symptoms of autism.** Participant 4 was the only participant of the 6 who was determined to have minimal to no symptoms of ASD. At baseline, Participant 4 scored 50% correct. After not having achieved mastery on the initial posttest (74%), participant 4 received individual remediation on the Module 2 content, and was retested. He achieved mastery of the content on this second post-test, with 90% correct. At the one month follow up posttest, Participant 4 had 76% correct, which is less than the preferred 85% mastery level. From the results of Participant 4's pre-post-post-post results, visual inspection revealed that 100% of the data points were nonoverlapping between the baseline and intervention phases (0 points overlapped). Ninety percent and higher of nonoverlapping data indicates a highly effective intervention for Participant 4. Figure 4.2 summarizes the results for Participant 4.



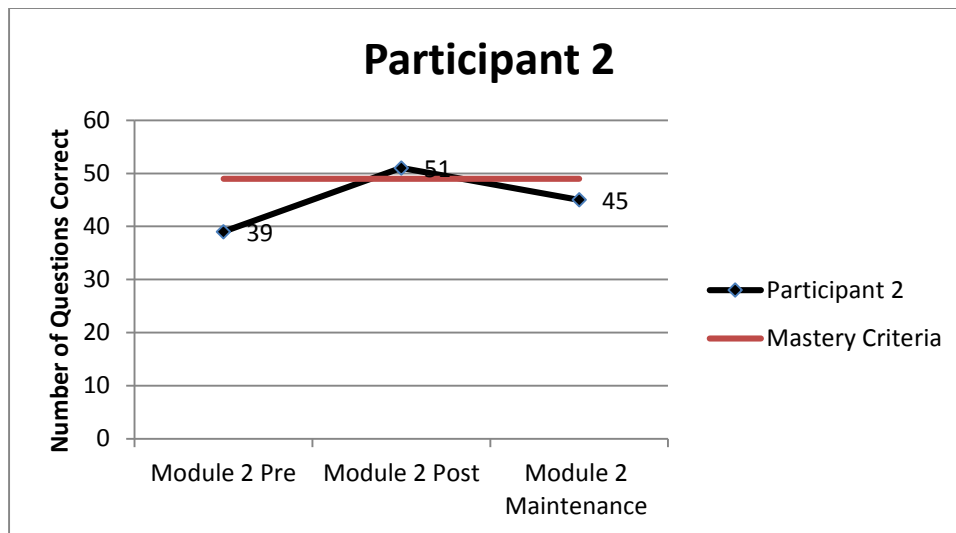
**Figure 4.2. Participant 4 Results.** The figure displays number of questions correct at each time point.

**Mild to moderate symptoms of autism.** There were four participants (1, 2, 5, & 6) that were categorized as having mild to moderate symptoms of autism based on their CARS2-HF cutoff scores. Notably, Participant 1 was above mastery at baseline having scored 88% correct. Participant 1 increased his knowledge acquisition at his initial posttest, scoring 98% correct, and therefore did not need to receive individual remediation with a retest. At the one month follow up posttest, Participant 1 had 95% correct, remaining above mastery criterion. From the results of Participant 1's pre-post-post results, visual inspection revealed that 100% of the data points were nonoverlapping between the baseline and intervention phases (0 points overlapped). Ninety percent and higher of nonoverlapping data indicates a highly effective intervention for Participant 1. Figure 4.3 summarizes the results for Participant 1.



**Figure 4.3. Participant 1 Results.** The figure displays number of questions correct at each time point.

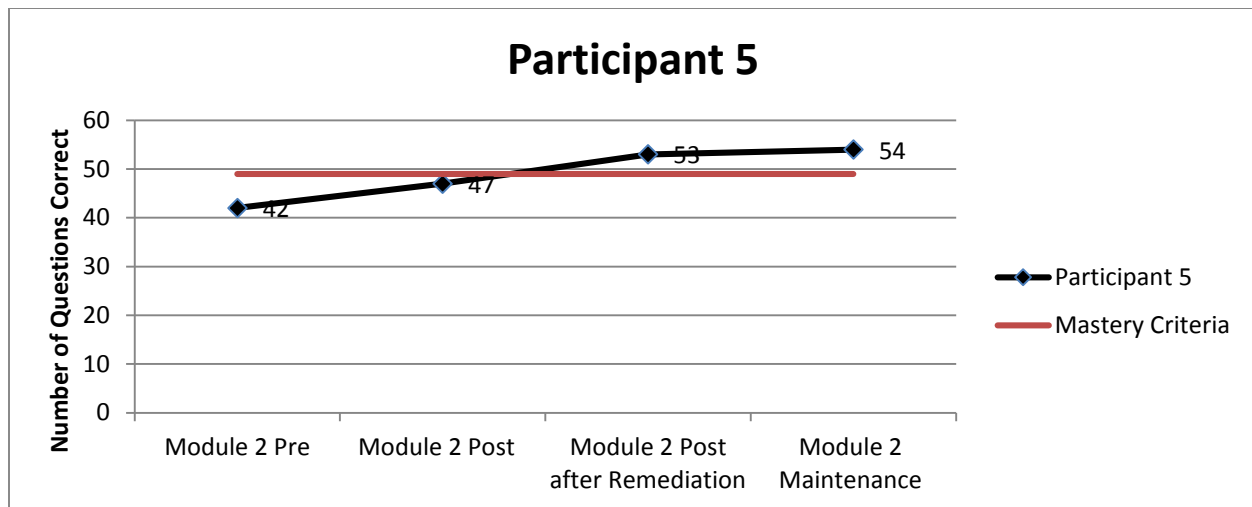
Participant 2 achieved 67% correct at baseline. Participant 2 increased his knowledge acquisition at his initial posttest, scoring 88% correct, and therefore did not need to receive individual remediation with a retest. At the one month follow up posttest, Participant 2 had 78% correct, which is below the preferred 85% mastery level. From the results of Participant 2's pre-post-post results, visual inspection revealed that 100% of the data points were nonoverlapping between the baseline and intervention phases (0 points overlapped). Ninety percent and higher of nonoverlapping data indicates a highly effective intervention for Participant 2. Figure 4.4 summarizes the results for Participant 2.



**Figure 4.4. Participant 2 Results.** The figure displays number of questions correct at each time point.

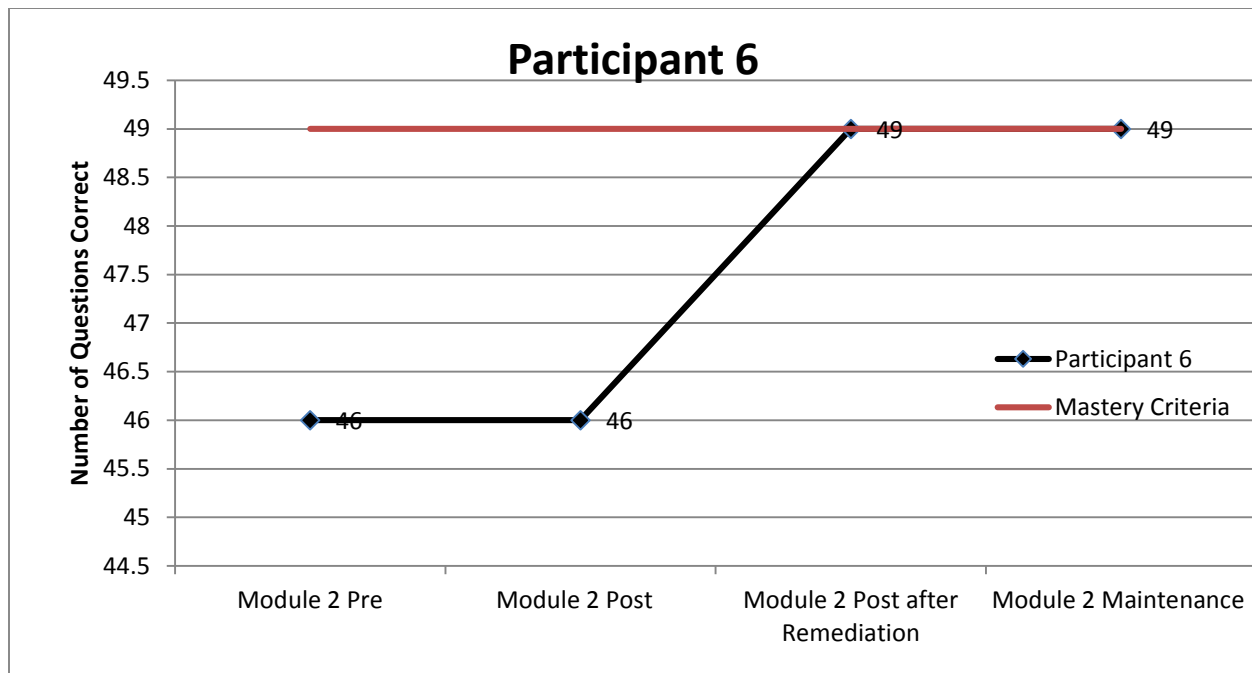
At baseline, Participant 5 scored 72% correct. After not having achieved mastery on the initial posttest (81%), Participant 5 received individual remediation on the Module 2 content, and was retested. He achieved mastery of the content on this second post-test with 95% correct. At the one month follow up posttest, Participant 5 had 93% correct, indicating that he retained knowledge above the preferred 85% mastery level. From the results of Participant 5's pre-post-post results, visual inspection revealed that 100% of the data points were nonoverlapping between the baseline and intervention phases (0 points overlapped). Ninety percent and higher of nonoverlapping data indicates a highly effective intervention for Participant 5. Figure 4.5 summarizes the results for Participant 5.





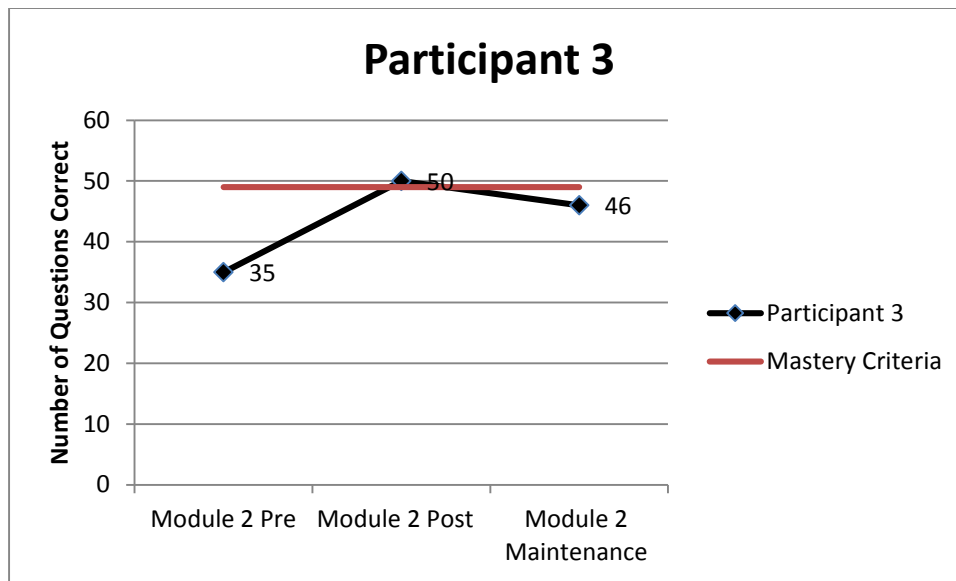
**Figure 4.5. Participant5 Results.** The figure displays number of questions correct at each time point.

At baseline, Participant 6 scored 79% correct. After not having demonstrated any change in knowledge acquisition nor achieving mastery on the initial posttest (79%), Participant 6 received individual remediation on the Module 2 content, and was retested. He achieved mastery of the content on this second post-test with 85% correct. At the one month follow up posttest, Participant 6 had retained knowledge by demonstrating 85% correct. From the results of Participant 6's pre-post-post-post results, visual inspection revealed that 66% of the data points were nonoverlapping between the baseline and intervention phases (1 point overlapped). This data indicates that the HR curriculum was minimally effective for Participant 6. Figure 4.6 summarizes the results for Participant 6.

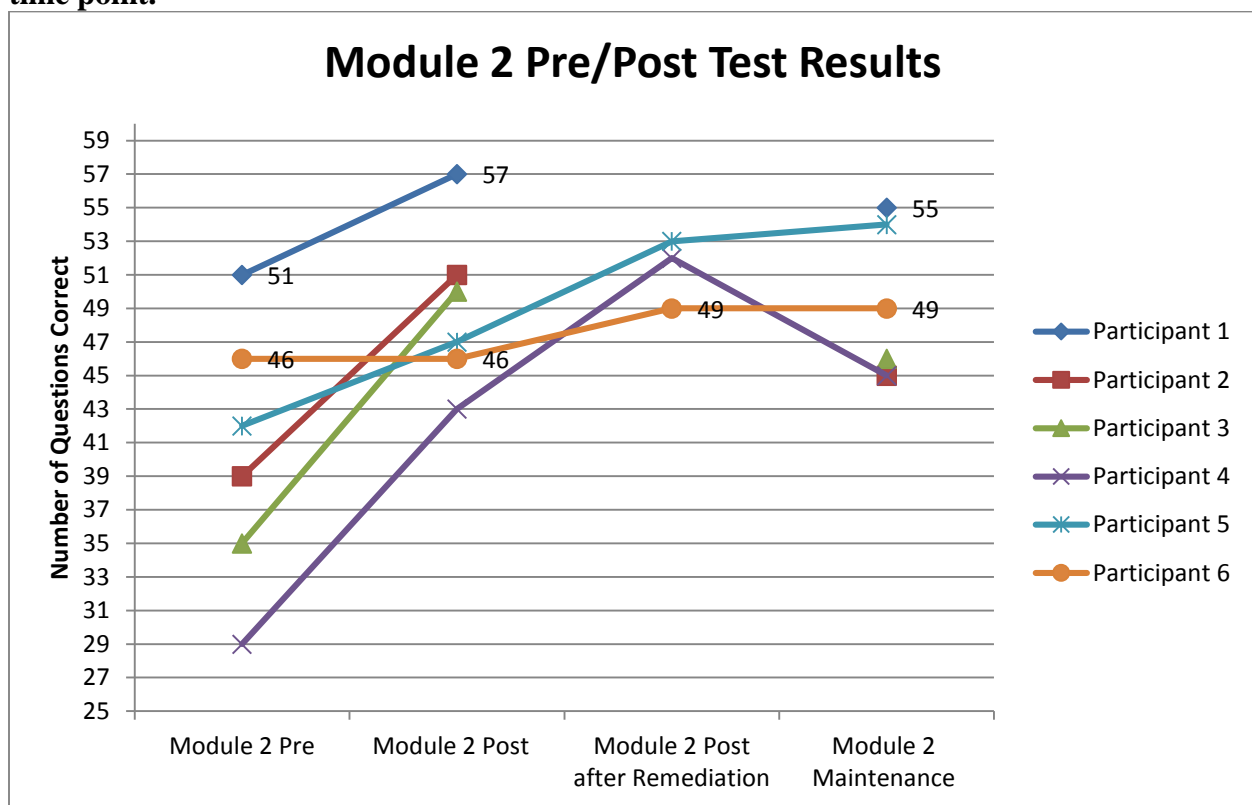


**Figure 4.6. Participant 6 Results.** The figure displays number of questions correct at each time point.

**Severe symptoms of autism.** Participant 3 is the only participant out of the 6 that is characterized as having severe symptoms of autism, designated by his CARS2-HF score. At baseline, Participant 3 scored 60% correct. Participant 3 increased knowledge acquisition at his initial posttest, scoring 86% correct, and therefore did not need to receive individual remediation with a retest. At the one month follow up posttest, Participant 3 had 79% correct, which is below the preferred 85% mastery level. From the results of Participant 3's pre-post-post results, visual inspection revealed that 100% of the data points were nonoverlapping between the baseline and intervention phases (0 points overlapped). Ninety percent and higher of nonoverlapping data indicates a highly effective intervention for Participant 3. Figure 4.7 summarizes the results for Participant 3. In addition, Figure 4.8 summarizes the results of all of the participants' results of their scores at baseline, intervention, remediation (if needed) and follow up phases.



**Figure 4.7 Participant 3 Results.** The figure displays number of questions correct at each time point.



**Figure 4.8. Module 2 Pre/Post Tests Results.** The figure displays number of questions correct at each time point for all 6 participants.

## CHAPTER V

### DISCUSSION

Some symptoms of ASD, such as social reciprocity and social communication deficits, have been shown to inhibit an individuals' successful sexual development. That is, the inability to interpret social cues, social learning deficits, and struggles with social communication can impair an individual with ASD's sexual knowledge acquisition and retention. In addition, other risk factors and frequently occurring problem behaviors experienced by individuals with ASD, such as misinterpretation of actions, deviant sexual behaviors and predisposition toward abuse also contribute to the difficulties in sexual knowledge development. However – similar to learning other activities – it is hypothesized that children and adolescents with ASD can improve their sexual knowledge when tailored curricula addressing their learning style is presented. Specifically, improvements in understanding physical and sexual development, understanding the natural desires they experience, and how to appropriately pursue relationships with others may be possible. Also, it may be possible to prevent potential problem behaviors of adolescents with autism when good programming is available.

Despite the documented need for effective interventions, there is very limited data regarding intervention programs in the existing literature. In particular, the extant literature is limited to samples of institutionalized adults and their understanding, beliefs, and experiences related to sexuality. Investigation about these facets in adolescents, where the onset of puberty is an important factor for all children, is under considered. There are no studies at the time of this writing that empirically investigate sex education for use with individuals with ASD.

The focus of the HR curriculum is unique because it uses evidence-based techniques to deliver instruction in a way that is well received by individuals with ASDs. In addition, it is designed for children and adolescents, asking and answering questions commensurate with their

age-level experiences; it can be administered in a school based setting. The HR curriculum has the potential to target several of the existing gaps in the literature, and thus the experimenter sought to understand whether the HR curriculum facilitates the sexual knowledge acquisition and retention of adolescents with ASD who evidence wide ranging ability levels, effectively. The chapter describes the results of the analyses as they relate to the research questions and hypotheses as well as findings reported in the existing literature. Finally, a discussion of implications, recommendations for future research, and limitations of the study are presented.

### **Summary**

Descriptive statistics were conducted prior to the main analyses in order to understand the demographics of the sample and the variables used in the study. The sample consists of six male adolescents with a mean age of 15.83 years. Each of the participants were previously diagnosed with an ASD according to the DSM-IV-TR (APA, 2000). One of the participants was considered to have mild autism symptomology, four of the participants were considered to have mild to moderate autism symptomology and one of the participants was considered to have severe symptomatology, according to the CARS-2HF rating scale.

After meeting prerequisites for starting the Module 2 material, baseline pre-test scores for all 6 participants averaged 69% correct, well below mastery criteria of 85%. All participants took an initial post-test. The average posttest score of all 6 participants combined was 85% which indicates that, in general terms, the participants, on average, acquired sexual knowledge at the mastered level, as mandated by the HR curriculum (Sutton & Wesley Spectrum Services, 2013). However, individually, three of the participants did not reach mastery criteria and therefore required individual remediation. Each of the three participants were then re-tested after receiving remediation and reached mastery criterion upon taking their second posttest. Finally, participants were tested at one month following the completion of Module 2 in order to assess

the retention of their acquired knowledge. The combined average of all 6 participants scored 85% correct, indicating that, in general terms, the participants retained the knowledge that they had acquired at a level commensurate with mastery criterion.

### **Findings Question 1a**

In the first research question, the researcher sought to understand whether the HR curriculum increased the sexual knowledge acquisition of adolescents with ASDs. It was originally hypothesized that the HR curriculum would significantly increase sexual knowledge acquisition. Consistent with evidence in the literature that individuals with ASDs are able to learn from and benefit from explicit instruction in sex education, the results reveal a statistically significant difference between pre and posttest means. The t-test yielded high power and a high effect size. Based on the results, the HR curriculum was effective in significantly increasing in sexual knowledge acquisition.

### **Findings Question 1b**

It is important to note that the HR curriculum significantly increased knowledge acquisition; however, it does not necessarily explain whether the curriculum was effective in increasing knowledge to a high level (e.g., a level considered mastery of the material). That is, given the low level of baseline knowledge of the participants, it may not take a high level of knowledge acquisition to obtain a statistically significant change. Although the results of the first research question yielded a high effect size, there may be a combination of safety issues and meaningful implementation factors (e.g., being able to perform the correct act at the correct time) that should be considered in order to make conclusions about how the acquisition of the knowledge in the module has the potential to prevent or stop many of the difficulties that arise without having this knowledge. At a minimum, the curriculum developers deemed it necessary to have at least 85% level of acquired knowledge in order to perform well socially.

Thus, research question 1b is investigating whether the participants achieved mastery of the material at their initial posttest probe. It was originally hypothesized that the majority of the participants, regardless of functioning level, would achieve mastery at their initial posttest because the curriculum was developed using evidence-based techniques that have been shown to be effective in working with individuals with autism. Results indicated that half of the participants did achieve mastery at their initial posttest and half did not. It should be noted that the errors on the tests were varied across participants. Given that the test was created to mirror the content of the lessons, this indicates that there were no systematic errors in the facilitation of the lesson, or inconsistencies in the lesson content and/or actual test materials.

The three participants that did achieve mastery upon their initial posttest were considered to either have mild to moderate symptoms of autism or severe symptoms of autism. The three participants who did not achieve mastery at the first posttest were considered to have either minimal to no symptoms of autism or to have mild to moderate symptoms of autism. With this considered, results indicate that it does not appear that the functioning levels of the participants contributed to their ability to receive the curriculum effectively. Rather, perhaps something other than ASD is accounting for the interference of knowledge acquisition such as differences in individual learning, failure to rehearse or encode, memory deficits, emotional dysregulation or some other learning disability, for instance.

Due to the developmentally sequenced design of the curriculum, participants are not permitted to continue onto Module 3 without having mastered previous material. The curriculum designates that either individual or group remediation should be used, depending on what is appropriate given group dynamics, facilitators, and parameters of the site. The participants who did not achieve mastery at the first posttest received individual remediation of the material and were retested. After individual remediation, each of the 3 remaining participants achieved at

least an 85% passing rate on their second posttest. The repetition of the material coupled with the delivery in an individualized manner may have contributed to the participants' ability to effectively acquire the lesson material and are important considerations to note when facilitating the curriculum to a diverse range of adolescents.

### **Findings Question 2a**

Research question 2a investigates whether the HR curriculum is effective in the knowledge retention of basic biological sex education after the knowledge is initially acquired. Due to the curriculum's mastery criterion, the initial mastery score, whether it was achieved at the first posttest score or the score from the retest after receiving remediation, was used in the analysis. That is, a new variable was created for the analysis that used the score that indicated mastery (i.e., either the initial posttest score of the 3 participants who achieved mastery on the initial posttest or the second test score of the 3 participants who needed remediation).

In order to measure knowledge retention, the participants must have first acquired the knowledge based on the curriculum's 85% passing rate on the posttest. Each participant achieved mastery, either on his first posttest try, or on his second posttest try after having received remediation. This new variable was created in this way because the purpose of the question is to measure retention after acquisition. Therefore, the level of each individual's mastery is used to compare against each individual's level of retention, one month post Module 2. With regard to the one-month follow up posttest, it was hypothesized that participants would maintain knowledge acquisition at the mastery level (i.e., 85% passing rate).

Results of the analysis indicated that there was a significant main effect, meaning there was a significant difference between the means of the data points (i.e., pretest, mastered posttest, one-month follow up posttest). Further analyses revealed that there was a significant change between the Pre-test to each person's Mastery level post-test. From the Mastery time point to



the Maintenance probe at one month following the completion of Module 2, there was not a significant change. In general, the scores slightly decreased. However, they did not decrease significantly. In other words, participants as a whole retained their initial knowledge acquisition at an average level that meets mastery criterion as mandated by the HR curriculum. Further, maturity or the passage of time did not increase knowledge.

### **Findings Question 2b**

Research question 2b is investigating if the HR curriculum is effective in the knowledge acquisition and retention for individuals who have a range of functioning abilities across the autism spectrum. It was originally hypothesized that the HR curriculum would be effective for knowledge acquisition and retention for individuals with autism regardless if they are low, moderately, or high functioning individuals. Results of research question 2a indicate that the *Healthy Relationships* curriculum is effective in the knowledge retention of participants who present in a wide range across the autism spectrum, as a group. Given the small sample size, the statistical power of the analysis would not be enough to warrant a very meaningful interpretation from the originally intended analyses. Instead, individual visual analysis and effect size calculations of each participant were used to help understand knowledge acquisition and retention in more depth as it relates to each participant's individual ability level.

There was one participant who was considered to have minimal to no symptoms of an ASD. This individual scored a 50% at baseline and 74% at initial posttest. Although a significant change, the individual received individual remediation, was retested, and achieved mastery criterion. At the follow up probe, the individual achieved 76% correct, which is less than the preferred 85% mastery level. Effect size indicates that, despite not retaining information at the mastery level, statistically speaking, the intervention was highly effective for this individual with minimal symptoms of autism. His need for individual remediation and slight

regression in the retention of the information could indicate a need for repeated, consistent, and individualized instruction, which is recognized both in the literature and as a strategy built into the HR curriculum as effective strategies for individuals with ASD.

There were four participants in the mild to moderate symptoms of autism category based on their CARS2-HF scores. All four of these participants achieved mastery at either their first or second posttest probe. Two of these participants needed individual remediation and two of them achieved mastery during the first delivery of the curriculum, which was in the whole group format. Three of these participants retained information at or above mastery criterion. Of those 3 who retained information at or above mastery level, 2 of them were also the ones who needed the individual remediation. Notably, the third participant who retained information above mastery level, had a baseline that began above mastery. He acquired additional knowledge and, although slightly regressed, maintained his acquired knowledge at a level above both mastery criterion, and his own baseline.

The final participant was considered to have severe symptoms of autism. He achieved mastery on his first posttest, and similarly to others, slightly regressed below mastery criterion upon follow up, but not to a significant degree. Effect size indicates that the intervention was also very effective for this participant with severe symptoms of autism.

At the one-month follow up posttest, four of the participants slightly regressed in their scores. Out of those four who slightly regressed, three of them regressed to a level that was below mastery criterion. None of the participants who regressed did so at a level that was below their baseline. The number of questions that these participants now answered incorrectly, from the time of mastery to one month follow up, ranges from 2-7 questions.

Those who needed remediation and those who retained or regressed appeared to be random. That is, it cannot be determined the extent to which an individual's symptoms

interfered with the acquisition and retention of knowledge. All of the participants, regardless of symptom severity level, achieved mastery using the protocol outlined by the curriculum. For 5 of the 6 participants, the curriculum was highly effective based on effect size calculations and visual inspection.

Despite the small sample size, these initial analyses indicate that the HR curriculum was effective for diagnostically diverse adolescents with ASDs and may be effective to others with ASD. The need for individual remediation and the fact that slight regression occurred in some participants could be due to several reasons. These reasons might include a reflection of the individual learning style, or some expected interference from their disorder which could be ameliorated with one of the flexible, researched based strategies that the HR curriculum suggests (i.e., individual delivery, slower pace, repeating material as needed, remaining consistently concrete in content delivery).

### **Conclusions**

The development of healthy relationships with others is a central and critical experience needed for high quality of life and for overall life satisfaction. The development of a healthy sexuality is necessary in order to develop healthy relationships with others. Sexual development is a multifaceted process that related to basic human needs such as acceptance, feelings of value, worth and attractiveness. It not only involves physiological functioning, but knowledge, beliefs, attitudes and socialization (Haffner, 1995; Van Bourgondien, 2007). Because social adeptness is necessary for successful and healthy sexuality development, children and adolescents with ASD often have difficulty due to the social deficits that define their disorder (Stokes, Newton, & Kaur, 2007).

Current research suggests that individuals with ASD demonstrate interest in sexuality as well as engage in a number of sexual behaviors (Haracopos & Pedersen, 1992; Kontstantareas &

Lunsky, 1997; Ousley & Mesibov, 1991; VanBourgonien, Reichle, & Palmer, 1997), despite contrary findings from early research (DeMyer, 1979; Dewey & Everard, 1974). Additionally, engaging in inappropriate sexual behaviors may occur because the typical development of sexual drives is not accompanied by an ability to understand the social norms that govern appropriate behaviors. There is a lack of understanding in the literature regarding sexuality for children and adolescents with ASD. There is also little sexuality programming available that is appropriate for adolescents with ASD. The analyses of these data indicate that the second module of the HR curriculum can be effective for children and adolescents. In addition, the HR curriculum attempts to fill several of these gaps in the literature in an effort to improve the quality of life for children and adolescents with ASD by increasing knowledge and skill using theoretically sound techniques.

### **Clinical Significance**

It was hypothesized that, regardless of functioning ability, the sample of adolescents would retain the information. Many of them regressed slightly in their knowledge retention. Despite the lack of statistically significant change in the maintenance of the question items, there are important clinical considerations for the items that were missed and/or not retained by the participants. The pre/posttest questions were designed to mirror that of the lesson content, and were chosen by the developers of the HR curriculum due to the safety and social implications that accompany a thorough understanding of the concepts that the questions intend to address. For example, understanding what sexual intercourse is, how pregnancy occurs, etc. are important concepts to understand for an individual who is seriously considering a sexual relationships with a partner. Although statistically speaking, the participants retained their knowledge at a minimally competent rate, serious consideration should be given to the items missed and not retained given the important safety implications. Therefore, it is imperative that the HR

curriculum and those caring for individuals with autism who are at risk for socially adept or unsafe behaviors to work to reinforce, reteach, and consistently provide appropriate information so that the information can be retained and used.

The HR curriculum was developed in order to be given consistently and with multiple reinforcers and dosages of material to address the skill regression that some individuals with autism experience. In addition to this strategy, the HR curriculum is intended to be administered in a timely fashion. That is, the ages at which the adolescents are receiving the intervention align with the period of development during which they are actually experiencing the physiological and psychosexual changes, urges, and desires (i.e. puberty, adolescence). Clinical experience has indicated that younger participants (i.e. middle school aged) tended to be too socially and physically immature to receive the information in a productive way or meaningful way. Conversely, participants who were older (i.e. late adolescence, participating in adult transition programs) experienced similar dissatisfaction with the curriculum due to anecdotal reports of having experienced many unsuccessful relationships pursuits and therefore a general feeling of hopelessness, apathy, or even disbelief interfered with their success with the curriculum. The timely manner of the HR curriculum for adolescents during this age period resulted in interest, engagement, and relevant learning based on actual pertinent life experiences happening concurrently with the reliable source of data coming from the HR curriculum.

Another consideration for maintaining knowledge acquisition after the curriculum has ended is addressed through the format of the HR curriculum. Individuals with ASD have difficulty translating social events and social nuances. Although the HR curriculum material provides a solid foundation for the sexual education knowledge, the material does not account for continuing to learn or understanding new events as the individuals continue to grow, develop, and engage in relationships. However, the HR curriculum mandates that a, “confederate,” is

designated for each participant. The confederate's job is to be a safe and trusted adult who is designated as a person to whom an individual can approach to ask questions, check out situations, and seek additional knowledge and strategies for proceeding. This built in reinforcement and teaching strategy addresses ongoing issues for individuals with autism after the formal program has ended.

## **Implications**

**Filling gaps in literature.** The current literature base regarding sex education for individuals with autism is scarce. There is some evidence to support that an individual with autism is able to learn and benefit from thoughtfully prepared instruction that is individualized and respectful of their symptoms. The results of the current study provide additional support for the assertion that individuals with ASDs can learn about and retain information regarding basic biological sex education.

Currently, the literature regarding adolescents with ASDs and their sexuality is also limited. There is limited knowledge reported in the literature about the sexuality in individuals with autism without any comorbid disorders, and even less so about the knowledge, attitudes, and behaviors of adolescents with ASDs surrounding their sexuality. The literature is limited by samples of adults and/or institutionalized samples; the sexuality of adolescents with ASDs who are not institutionalized is not represented in the existent literature. The goal of the HR curriculum's design is to provide mental health professionals and educators with a structured group intervention that provides opportunities for students to learn relevant and necessary facts about healthy, normal development and the pursuit and maintenance of appropriate relationships with others. The HR curriculum explicitly targets this population (i.e., children and adolescents with ASDs who are not institutionalized and who do not have comorbid conditions) and was created due to the increasing need that caregivers and mental health professionals are

experiencing, despite the lack of attention received in the literature. The results of the current study are the beginning of building an evidence base that not only targets several limitations in the current knowledge base for this population, but also fills a practical need for health care providers, and, ultimately, adolescents with developmental disabilities.

There are sex education curricula that exist to target most adults with ASDs; however, they have not been empirically investigated. In addition, there is no research to date that examines the effectiveness of sex education curricula specifically designed for children and adolescents with ASD administered in school settings. The current study addresses these limitations. The current study provides a preliminary investigation of a curriculum designed to target children and adolescents with ASDs and was originally intended for implementation in the school setting. The overall results of the study indicate that children and adolescents are able to learn from and retain sex education knowledge in the school setting, given a thoughtful and theoretically sound intervention.

**Considerations for implementation.** The HR curriculum was designed, and is currently implemented as a reaction to a perceived need that is increasing. Children and adolescents engage in problem behaviors both clinically and in the literature that may include inappropriate touching of themselves or others, deviant sexual behaviors, masturbatory behaviors that occur in public, close pursuit of preferred individuals, etc. In some cases, these challenging behaviors may cause involvement with the legal and justice system.

Problem behaviors arise because the deficits of ASD interfere with normal physical development. That is, children and adolescents with ASDs develop at a rate that is typical physically. This includes desires and urges that accompany puberty, but because of their deficits, they are unable to learn in the same way as their neurotypical peers and so acting upon normal wants and desires may be executed inappropriately and/or dangerously for those

individuals or others. Although currently implemented as a reaction to a perceived need, the HR curriculum is a program that is able to be a proactive intervention. The program may be implemented in a preventative manner to give children with ASD the information that they are lacking due to their disorder to stop problem behaviors before they start as well as to increase the development and maintenance of health and age appropriate interpersonal relationships.

The HR curriculum is a manualized treatment that has typically been implemented in school based programs. It aligns with the Pennsylvania state education standards, which allows it to be offered as an elective course for those students who need it. Offering it as an elective course, as either a substitute or supplement standard health courses, for adolescents with ASDs would benefit students in that it would be a direct part of educational programming. It would not require that students be removed from their current placement to participate in the group as it is typically delivered currently. The curriculum is a manualized treatment, similar to the format of a lesson plan, making a smooth transition and familiar implementation for educators and school based mental health professionals. It also gives parents of children who need the curriculum assurance that their children are receiving relevant educational programming in schools, rather than needing to seek this assistance, elsewhere. There is a potential to be able to align the curriculum with other state education standards outside of Pennsylvania, so that the curriculum could be more widely used in this way.

A benefit of the HR curriculum is that, although it is a structured, manualized treatment, it is able to be modified for a variety of populations as well as able to be implemented in a variety of settings other than school-based settings. It can be modified for use for a range of adolescents including typically developing adolescents, younger children with ASDs (higher middle school aged), individuals with intellectual disabilities, those with other developmental disabilities, or those with executive functioning deficits, etc. However, selection of students in



the group will be key. It is recommended to have a relatively homogeneous group so that modifications can be made to reach and be received by everyone in the group similarly, rather than compromising progress for some while accommodating others. The lessons are flexible enough to tailor to individual needs in the group when considering differences in age, maturity and life experiences. Included in the lessons, are optional activities that allow for enhanced discussion and practice for topics deemed necessary by the facilitators, given the nature of the group's participants. In addition, although originally intended to solve the need for it to be given in the school-based setting, the HR curriculum could be implemented in outpatient facilities, residential facilities, juvenile delinquent facilities, etc.

### **Limitations**

This research study serves to understand the effectiveness of a sex education curriculum in the increase and retention of knowledge in adolescents with ASDs. A limitation to the study as far as its external validity is the extent to which the results can be generalized to the curriculum's intended population (i.e. adolescents with ASDs). The study does not allow for generalization of results because the sample examined a small sample of only male participants with ASDs who were from the same class and participating in the same educational curricula in a single school based facility. Although an ASD diagnosis is more prevalent among males than females, there may be significant variation between gender, race, and regional demographics if a larger sample size were to be studied. Despite the recommendation of the curriculum to choose homogenous groups for implementation purposes, the study's sample homogeneity limits the generalizability of the results for a larger adolescent ASD population. Of note, the small size of the sample had the potential to lower the overall power and increase the likelihood of a Type II error. However, power in the current study was not compromised due to the resulting large effect sizes.

Second, the ASD diagnoses of the participants in the current study were very broad, based on the diagnostic criteria from the *DSM-IV-TR* (APA, 2000), and were classified into ability levels based on the CARS2-HF. The use of the existing data set did not allow for further discrimination between Autistic Disorder, High Functioning Autism, Asperger's Syndrome, or Pervasive Developmental Disorder, NOS. In addition, *The Diagnostic and Statistical Manual of Mental Disorders- Fifth Edition* (DSM-V; APA, 2013) will outline differing criteria for Autism Spectrum Disorder, which was not in place at the time of data collection. Future research may want to consider whether different diagnostic groups along the spectrum would produce similar results as the current study.

The study is also limited due to the inability to carry out full data collection as originally proposed due to practical, site-based limitations. Because data was collected in a school based setting, and was not started at the beginning of the year, further maintenance probes were unable to be collected as originally planned because the school year ended. Future studies should incorporate additional maintenance probes further than 1 month out, to better understand the effectiveness of the curriculum for knowledge retention in this population. In addition, with a larger sample, acquisition and retention can be more fully examined using statistical analyses above and beyond individual visual analyses.

Finally, there is not a way to account for extraneous variables within the current study. For example, it is unclear the extent of influence that factors such as natural maturity, other health classes that may be simultaneously running in the school setting, or the effect that Module 3 material may have on the knowledge acquisition and retention of Module 2 material. Although the ultimate goal of the curriculum is to increase and retain this important knowledge, it is difficult to parcel out these and similar extraneous variables to understand how they are effective the empirical value of Module 2 of the HR curriculum. Although the current design of the study

compares each individual's progress against their own baseline control, the design of the study may strengthen with the addition of a control group to compare against the treatment group's results.

### **Directions for Future Research**

This preliminary investigation of the effectiveness of the HR curriculum for adolescents with ASD demonstrates improvement in the small sample of its intended recipients. These promising results inform several implications for future directions for research in this area of the psychology field. There is limited research that exists which seeks to understand the needs and desires of children and adolescent around sexuality. In addition, there are no studies to date that empirically investigate the effectiveness of sex education curricula to target this population. Therefore, there is a continued need for research in these areas.

Based on the previously reported study limitations, future research should focus on the use of a larger and more diagnostically and demographically diverse sample that includes consideration to the newly implemented diagnostic criteria. This would allow for increased generalizability of findings, as well as a more detailed reporting of trends of knowledge acquisition and retention across the autism spectrum. In addition, the study should be replicated and include additional maintenance probes to understand whether or not the knowledge is retained over a further period of time. At times, individuals with ASDs regress in skill level due to several reasons that may inconsistency in treatment delivery, schedule changes (i.e. vacations, school breaks, etc.) or when fading and generalization of skills is occurring. Continuing to assess knowledge retention over time will reveal increased understanding of the effectiveness of HR curriculum of Module 2, in light of these factors.

Finally, the HR curriculum currently includes two other modules. Module 1 includes knowledge and skill building with regard to basic hygiene and Module 3 includes knowledge and

skill building with regard to appropriate interpersonal relationships. Future research should investigate the effectiveness of the other two modules as well as the HR curriculum as a whole in its effectiveness in facilitating healthy relationships and improved quality of life for children and adolescents on the autism spectrum.

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